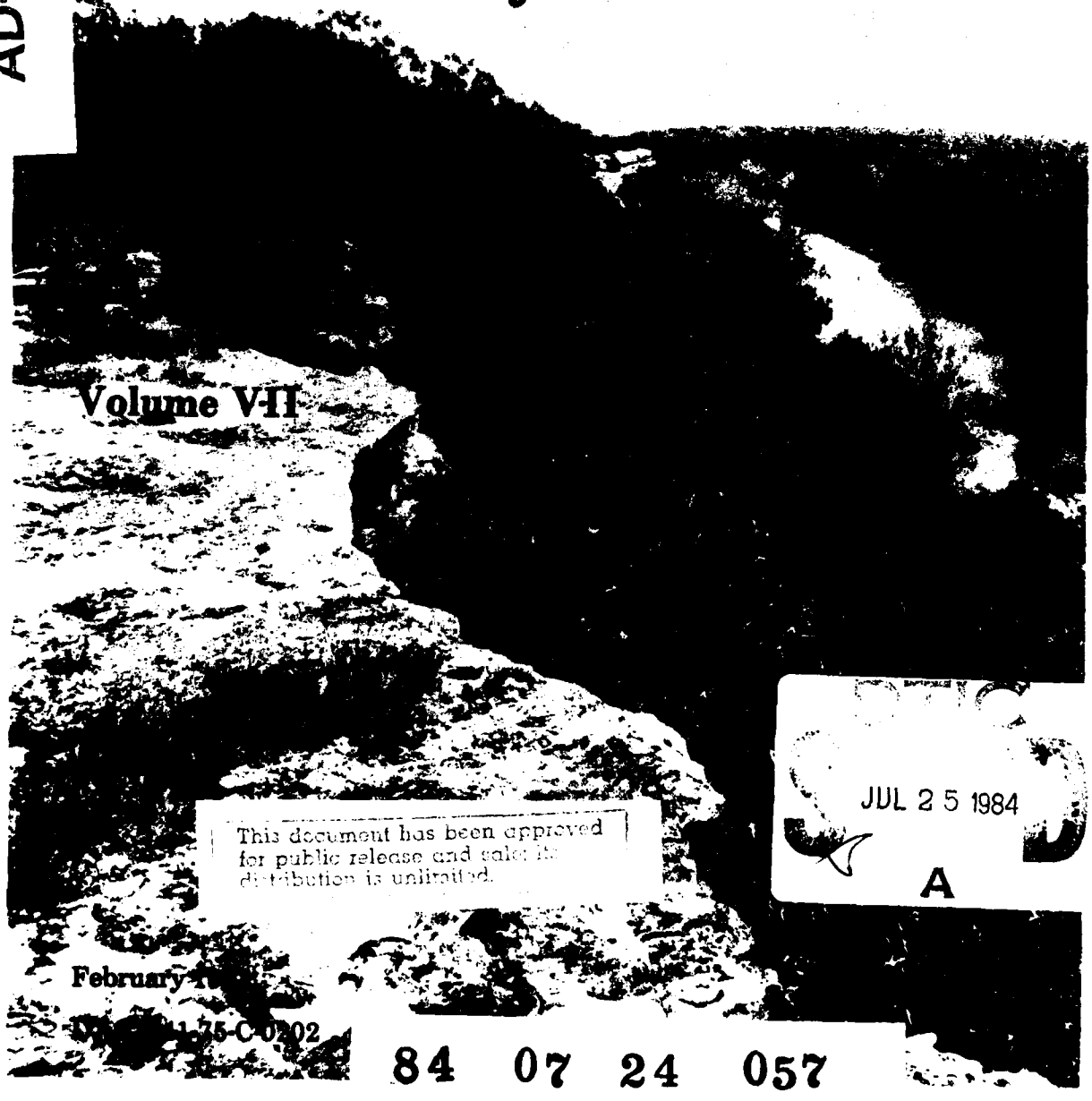
US Army Corps
of Engineers
Kansas City District

Harry S. Truman Dam and Reservoir, Missouri

American Archaeology Division Department of
Anthropology, University of Missouri - Columbia
Columbia, Missouri

Cultural Resources Survey Harry S. Truman Dam and Reservoir Project



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20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

The ten volumes report the results of a cultural resources survey in the Harry S. Truman Dam and Reservoir Project, Henry, Benton, St. Clair, and Hickory counties in southwestern Missouri. The combined volumes relate the findings of historical, architectural, archeological surveys conducted between 1975 and 1977. Volume I contains an outline of Osage River history to serve as a background for historical studies; Volume II is a historical gazeteer. Volume III contains the architectural survey of the reservoir. Volumes IV

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through IX report the archeological survey of the reservoir. Volume IV is a description of the archeological survey, the results of that survey, and an analysis of prehistoric settlement-subsistence patterns in the reservoir area. Volume V contains analyses of surface collections obtained during the survey, and includes studies of chipped stone tools, ground stone tools, hematite, ceramics, and projectile points.

Volume VI consists of an interpretation of the Euro-American settlement of the lower Pomme de Terre River valley. Volume VII is a study of the results of preliminary testing at several sites in the lower Pomme de Terre River valley. Volume VIII contains the results of excavations in rock shelters along the Osage River. Volume IX contains studies relating to tests conducted in early occupation sites in the reservoir area, and an analysis of some Middle Archaic materials.

Finally, Volume X contains four environmental study papers, detailing the bedrock and surficial geology, the historic plant resources, and special studies of the soils and geology or portions of the reservoir.

Block 7.

Russell L. Miller, Stephen A. Chomke, Andrea L. Novick, Charles E. Cantley, Janet E. Joyer, R. A. Ward, T. L. Thompson, C. V. Haynes, F. B. King, and D. L. Johnson.

(1)

CULTURAL RESOURCES SURVEY

HARRY S. TRUMAN DAM AND RESERVOIR PROJECT

VOLUME VII

ARCHEOLOGICAL TEST EXCAVATIONS: 1975

by

Stephen A. Chomko

A PROJECT CONDUCTED FOR THE
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REPORTS OF THE

CULTURAL RESOURCES SURVEY

HARRY S. TRUMAN DAM AND RESERVOIR PROJECT

Volume I: CHRONOLOGY OF OSAGE RIVER HISTORY, by Curtis H. Synhorst. 399 pp.

Volume II: HISTORICAL GAZETTEER AND MITIGATION RECOMMENDATIONS, by Curtis H. Synhorst. 340 pp.

Volume III: ARCHITECTURAL SURVEY, by Nanette M. Linderer. 85 pp.

Volume IV: THE ARCHEOLOGICAL SURVEY, by Donna C. Roper. 253 pp.

Volume V: LITHIC AND CERAMIC STUDIES

- Part I: Ground Stone Implements, by Michael Piontkowski, pp. 1-25
- Part II: Hematite in the Harry S. Truman Reservoir Area, by Deborah E. House, pp. 27-72
- Part III: Introduction to the Truman Reservoir Pottery, by Lisa G. Carlson, pp. 73-120
- Part IV: Projectile Points, by Donna C. Roper and Michael Piontkowski, pp. 121-268
- Part V: A Preliminary Examination of Chipped Stone from Truman Reservoir, Missouri, by David E. Griffin and Michael K. Trimble, pp. 269-349

Volume VI: EURO-AMERICAN SETTLEMENT OF THE LOWER POMME DE TERRE RIVER VALLEY, by Russell L. Miller. 75 pp.

Volume VII: ARCHEOLOGICAL TEST EXCAVATIONS IN THE HARRY S. TRUMAN RESERVOIR, MISSOURI: 1975, by Stephen A. Chomko.

Volume VIII: ARCHEOLOGICAL TEST EXCAVATIONS: 1976, by Andrea L. Novick and Charles E. Cantley. 126 pp.

Volume IX: PRELIMINARY STUDIES OF EARLY AND MIDDLE ARCHAIC COMPONENTS

- Part I: Preliminary Archeological Investigations at Two Early Archaic Sites: The Wolf Creek and Hand Sites, by Michael Piontkowski, pp. 1-58
- Part II: The Distribution of Middle Archaic Components in the Truman Reservoir Area, by Janet E. Joyer, pp. 59-80

Volume X: ENVIRONMENTAL STUDY PAPERS

- Part I: Bedrock and Surficial Geology of the Harry S. Truman Reservoir Area, West Central Missouri, by R. A. Ward and T. L. Thompson, pp. 1-21
- Part II: Report on Geochronological Investigations in the Harry S. Truman Reservoir Area, Benton and Hickory Counties, Missouri, by C. Vance Haynes, pp. 23-32
- Part III: Spatial and Temporal Distribution of Plant Resources in the Harry S. Truman Reservoir, by Frances B. King, pp. 33-58
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ACKNOWLEDGEMENTS

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Many people contributed to this project, both in the field and during analysis. I want to thank Larry D. Grantham, Northeast Missouri State University at Kirksville, for identifying the gastropods, and Robert E. Warren, University of Missouri-Columbia, for his aid in identifying the mollusks. Crew members were Susan Badwey, Charles Cantley, James Feagins, and Edward Fulda. Special thanks are extended to Burt and Gladys of the Cross Timbers Emporium, and to the people of Hickory and Benton counties.

I want to express my appreciation to W. R. Wood for his comments throughout the field work and analysis and for his editorial assistance. Nevertheless, any errors in the presentation or interpretation of the data herein are mine.

SAC

ARCHEOLOGICAL TEST EXCAVATIONS: 1975

by

Stephen A. Chomko

ABSTRACT

Test excavations were made in the summer of 1975 on four archeological sites (which span the period from approximately 3500 to 1000 BP) in the Harry S. Truman Reservoir, southwestern Missouri. Two open sites on the Pomme de Terre River were tested. The Pippens Site, 23BE214, in the uplands above the river, has a Woodland and Archaic component. Multicomponent Late Archaic and Late Woodland site, 23HI241, is on Terrace 1b in the valley. In addition, two small rockshelters on Bell Branch were tested: site 23HI246 has a probable Woodland component; Beck Shelter, 23HI247, is defined as a single component Late Woodland site exhibiting Mississippian influence. Site locations and physiographic settings are presented along with detailed descriptions of artifact content. The components are placed in a chronologic framework by comparison to other stratified sites in the reservoir area. Finally, each component is summarized in terms of types and relative importance of activities carried out at the sites.

INTRODUCTION

The site testing program undertaken in the summer of 1975 was conducted as part of an ongoing research project in the western Ozark Highland (Wood and McMillan 1976 present a summary of this work through 1973). Research concentrated on sites along the Pomme de Terre River in the Harry S. Truman Reservoir which, upon completion, will inundate 22,551 hectares (55,600 acres) at the conservation pool level with the multipurpose pool level at an elevation of 215 meters (706 feet). All sites reported herein (Fig. 1) are on land owned by the U.S. Army Corps of Engineers.

A research design was originally formulated to test sites in different ecological-geomorphic settings along the Pomme de Terre River (in the study locality defined by McMillan 1971), to develop a model of valley use patterns through time. Sites to be tested were randomly selected from the population (at the time, 35 sites were known), stratified on the basis of site location (terrace, upland), size (based on survey forms and determined to be camp or village sites), site type (open, rockshelter), and stream rank. It became readily apparent that the previously reported sites were a small and highly biased sample of the sites in the study locality (more than 200 are now recorded). A new research strategy was developed to locate and test sites which would help to fill in missing or poorly represented segments of the cultural-chronological record of the area: essentially these are the periods represented by sterile deposits at Rodgers Shelter, between about 9500 to 8600 and 6300 to 3000 BP, and the late ceramic period.

Both 23BE214 and 23HI241 were chosen by random selection from the original stratified sample of sites. Sites 23HI246 and 23HI247 were chosen to aid in the interpretation of Late Woodland cultural dynamics. After work was completed at 23HI247, efforts were directed to site survey.

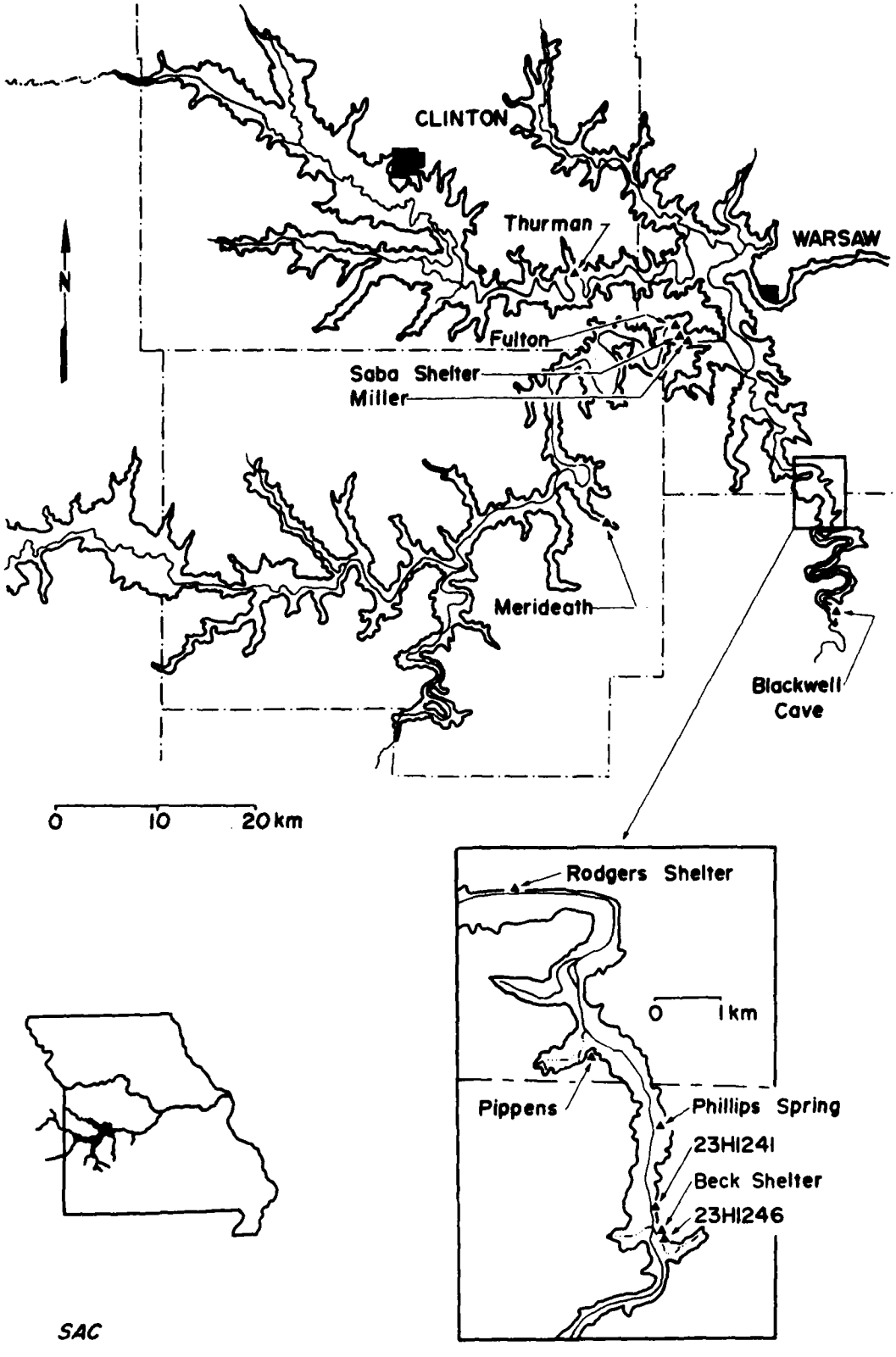

Figure 1. The Harry S. Truman Reservoir Area, showing sites discussed. Reservoir insert shown at multipurpose pool level only.

ENVIRONMENT

The environmental setting of the lower Pomme de Terre River valley has been described in detail by McMillan (1971; 1976b). Only a brief synopsis is presented here.

The deciduous forest of the Ozark Plateau merges with tall grass prairie to form a broad mosaic ecotone in the study locality. An oak-hickory forest is typical of the valley forest with a post oak-jack oak association common on hillslopes while upland vegetation is characteristically tall grass prairie. The number of floral and faunal species has been enhanced by an "edge effect" typical of ecotonal situations (see Odum 1959). Floral resources are detailed by Kucera (1961) and Steyermark (1959; 1963); faunal resources are described by Schwartz and Schwartz (1959), Pflieger (1971), and Anderson (1965).

Soils are typically the Lebanon-Nixa-Clarksville and Hobson-Clarksville soil associations (Scrivner et al. 1966: 25). Lebanon and Hobson soils are confined to ridge tops and vary as to parent material, while Nixa and Clarksville soils occur on cherty hillslopes. As would be expected, each soil type has associated vegetational patterns.

The weather patterns of the area are those described by Borchert (1950: 29) for Climatic Region IV. Precipitation averages 102.5 cm (40 inches) per year, with most moisture falling during the spring and summer. However, recharge of soil-stored water takes place during the winter months (Scrivner and Baker 1972: Fig. 1). Monthly temperatures range from a mean of 1.2°C (33.5°F) in January to 37.9°C (79.4°F) in July, with a 177 day growing season (data cover a 38 year period recorded from a

station in Warsaw: Moxom 1941).

Haynes (1976) has developed a sequence of river aggradation and degradation for the lower Pomme de Terre valley. Four major terraces are currently recognized: T-2, the oldest and highest terrace, dates at 35,000 to 20,000 BP; T-1a was formed between 27,000-20,000 to 16,500-13,500 BP; T-1b represents the period 11,000 to 6,000 BP, and is followed by a period of terrace stability; finally, T-0 began to form about 800 BP, but has been abandoned since the Pomme de Terre Dam was closed. Terrace 1b coincides with the earliest known human occupation in the area.

Ahler's (1973a; 1973b; 1976) studies of sediments from Rodgers Shelter suggest there are four major stratigraphic units in Terrace 1b, each with minor subdivisions. The period 10,100 to 8800 BP marks maximum aggradation of the terrace with inferred high precipitation and stable hillslope vegetation; 8800 to 8000 BP witnessed a depletion in hillslope vegetation, and 8000 to 7500 BP marks an erosional unconformity. A unit representative of decreased precipitation occurs at 7500 to 6300 BP and is followed by a period of maximum hillslope erosion. The final period, 3000 to 500 BP, witnessed the return of hillslope vegetation and increased precipitation.

ANALYSIS

The following format is used to retain continuity throughout the report and to avoid unnecessary repetition. Artifacts from all sites were first sorted into major classes (e.g., chipped stone, ground stone, ceramics, etc.) and the classes were subdivided into types which were sequentially numbered; type names follow terminology in earlier site reports for the area (see Vehik 1974; Falk 1969; Chomko 1976 among others). Attributes selected for type definition were those distinguishing between-group differences while maximizing within-group similarities. Each group (type) is polythetically defined—artifacts share a majority of attributes (Clarke 1968: 189-191).

Chipped stone tool descriptive terminology follows Binford (1963); Ahler (1971) provides a descriptive definition of impact fractures, while other fracture types are defined in Chomko (1976). A distinction between tool "segments" and "fragments" is based on the former retaining two margins while the latter only have one margin. Wear is recorded in terms of use chip scars (Binford's [1963] tertiary chipping) or edge rounding (Ahler's [1971] edge rounding, smoothing and blunting). Edge angles, in 5^{o} intervals, taken on blade edges are an average of three measurements per artifact (see Chomko 1976: Fig. 13). Determination of heat treatment of artifacts is based on criteria outlined in Collins and Fenwick (1974), Klippel (1970), Mandeville (1973), and Mandeville and Flenniken (1974); since some characteristics of color and "gloss" occur naturally in locally available chert, the determinations must be considered tentative.

Terminology for modified flakes follows A. M. White (1963) and Chomko (1976). Previously the plan view and cross section of a working element was nominally described; in this report nominal descriptions are retained, but the deviation of the center of the working element from a hypothetical plane drawn through its ends is measured (positive figures indicate convexity, negative values indicate concavity). Also, two measurements are recorded using the working element as the point of reference. Tool length is the maximum measurement perpendicular to the plane of the working element; tool width is the maximum measurement parallel to the working element. Measurements of total length, width, and thickness use the striking platform as the reference point. Flakes exhibiting a lipped striking platform are considered to be bifacial retouch flakes. Shatter is distinguished following the definition in Binford and Quimby (1963: 288). Finally, ceramic descriptions follow the format in Vehik (1974).

All linear measurements were taken with a pair of sliding calipers, weights with a beam balance, edge angles with a goniometer, and colors with a Munsell Soil Color Chart. Size definitions for pebbles-cobbles-boulders are from the American Geological Institute (1952); soils terminology follows Buol et al. (1973). Objective data for each artifact are presented in tabular form; provenience is recorded for artifact groups by excavation unit. Artifacts from 23HI246 and 23HI247 were immersed in dilute hydrochloric acid to remove the travertine.

Site discussions are divided into two sections; intrasite comparisons briefly examine cultural-chronological relationships of diagnostic artifact types, and the spatial patterning and functional classification of the groups. Functional determinations are based on wear (after Ahler 1971; Semenov 1964; Frison 1968), edge angles (after

Wilmsen 1970), and minimally on morphology (following Ahler and McMillan 1976). Interpretation of bifacial retouch flakes follows Shiner (1969; 1970) and Frison (1968, 1970). Intersite site discussions are detailed comparisons of major diagnostic artifact groups with material from other stratified sites in the reservoir.

Artifact illustrations were prepared by the artifact's first being smoked with ammonium chloride, then being photographed in a black box. The photographs were then cut out and mounted on gray illustration board.

PIPPENS SITE, 23BE214

The Pippens Site is on the left (west) bank of the Pomme de Terre River in an upland setting (above the currently recognized highest terrace), about 42 m above and 400 m southwest of the river (Fig. 2). The legal designation is the NW¼SE¼SW¼ Sec. 3, T38N, R22W, Fristoe Quadrangle (U.S.G.S. 15 minute series).

The site is on one of a series of low, rolling hills which form the uplands adjacent to the Pomme de Terre. At the time of survey and testing the area was in ungrazed pasture which prevented precise delimitation of site boundaries. A small unnamed creek bounds the site to the west and north, entering the Pomme de Terre 365 m north of the site. Another small creek runs along the eastern margin of the site and enters the river approximately 200 m to the north. Both creeks and the river bottoms support an oak-hickory forest. Pippens cemetery was once on top of the hill north of the site but was moved by the U.S. Army Corps of Engineers. A pond was southwest of the cemetery and a house is said to have been nearby.

After the site area was mapped, four 1.5 m^2 excavation units were arbitrarily chosen; two units were dug on the upper portion of the eastern slope of the hill and two units were dug near the top of the hill. The plow zone was removed as a single unit, and a 10 cm level was excavated into the subsoil. A 50 cm^2 level was dug in the southwest corner of each square to a depth of 25 cm below plow zone to insure that sterile deposits were reached. All backfill was passed through a ¼ inch mesh screen. Artifacts were cataloged by assigning each level in an excavation unit a

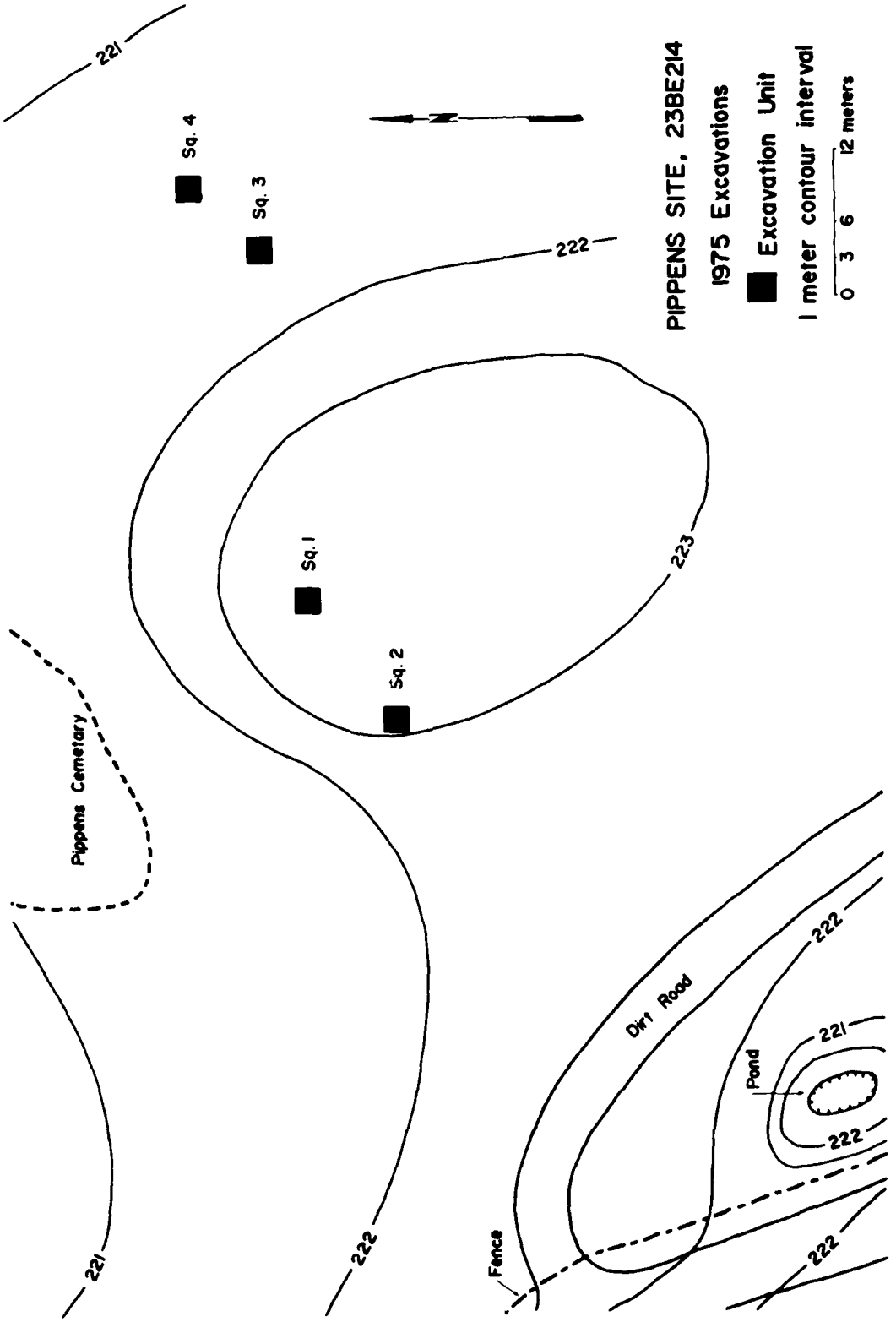

Figure 2. The Pippens Site, 32BE214.

catalog number; individual artifacts were then assigned a specimen number.

Stratigraphy

Only two stratigraphic units are recognized; they are described from the profile taken on the south wall of Square 1. The upper unit, a plow zone (A_p), extends to a depth of 18 to 22 cm. It is a structureless, dark yellowish brown (10YR4/4) clayey silt with chert inclusions and abundant cultural material. The lower unit (B_{2t}) is a fine subangular blocky, dark yellowish brown (10YR4/4) clayey silt with dark reddish brown (5Y3/4) mottles and many pebble-sized chert inclusions. The unit was exposed to a depth of 35 cm, but cultural material was confined to the top 5 cm.

Soil samples taken from both strata were waterscreened through a No. 40 U.S. Standard Screen; they yielded only a few small flakes.

Cultural Remains

CHIPPED STONE

Projectile Points

The nine projectile points are divided into 5 groups based on basal morphology and blade form. Additional categories include medial and distal segments and unclassifiable fragments. Measurements are presented in Table 1.

Group 5: Contracting Stem Point: Concave Base

The haft element of two points with contracting stems make up this group. The tang has bifacially retouched contracting lateral edges and a concave base, formed by longitudinal primary retouch and conchoidal secondary retouch.

Group 7: Side-Notched Point; Concave Base (Fig. 12, a, d)

Two distally fractured projectile points have ovate blades with even chipped lateral margins. Cross sections are biconvex (Specimen 10-14) or planar-convex (13-10). Primary chipping is obscured; secondary chipping is lamellar, bifacial-bilateral, and continuous; tertiary chipping occurs as unilateral edge crushing on specimen 13-10. Haft element juncture is lateral-lateral (but is approaching lateral-basal), resulting in pronounced, rounded shoulders. The tang has even chipped expanding lateral edges and a pronounced concave base (approaching a bifurcated basal form). Basal secondary retouch is bifacial and longitudinal; primary retouch consists of a single, unifacial scar. The bases are lightly ground. One distal break is a possible impact fracture; the other, a hinge fracture.

Group 8: Side-Notched Point; Convex Base (Fig. 12, e)

One heat-shattered projectile point has an ovate blade with even chipped lateral edges and a biconvex cross section. Primary chipping is obscured; secondary chipping is conchoidal, to expanding, bifacial-bilateral, and continuous (the blade appears to have been reworked); one margin exhibits steep, angular expanding scars and heavy edge crushing; tertiary chipping occurs as unifacial use chip scars. The haft element juncture is lateral-lateral, with well defined shoulders and notches. The tang has ground, convex lateral edges and a convex base formed by unifacial longitudinal primary retouch and unifacial conchoidal secondary retouch and grinding. The distal part of the point was reworked but still exhibits an impact fracture.

Group 12: Corner-Notched Point; Ovate Blade, Convex Base (Fig. 12, c, f)

Two distally fractured points, believed to have had

ovate blades with even chipped lateral edges, are included in this group; in addition, one tang element is included on the basis of form and retouch pattern. The points are plano-convex in both cross sections. Primary chipping is obscured; secondary chipping is lamellar, bifacial-bilateral, and continuous; tertiary chipping is indeterminate. Blade form and chipping characteristics are based on fragments believed to be portions of specimen 10-2. The haft element juncture is lateral-basal resulting in angular, projecting shoulders and angular basal corners. The tang has even chipped expanding lateral edges formed by lamellar secondary retouch. The base is markedly convex and was formed by bifacial, conchoidal secondary retouch over a large primary retouch scar. One point is heat treated; one is indeterminate; and one was not heat treated. One point was heat fractured, one has an irregular fracture, and one has a probable impact fracture.

Group 14: Expanding Stem Point; Concave Base (Fig. 12, b)

A basal portion of a point with an expanding stem is included in this category. The tang has bifacially worked and ground, contracting lateral edges and a concave base formed by a single longitudinal primary retouch scar and bifacial longitudinal secondary retouch. The base was ground, resulting in abruptly rounded basal corners. The item appears to have been heat treated.

Group 17: Projectile Points; Medial Segments

This group is composed of two medial segments believed to be portions of projectile points. The group is distinguished from medial biface segments (Group 45) on form and by a more regular chipping pattern.

Group 19: Projectile Points; Distal Segments

This group is made up of two heat treated projectile

TABLE 1

Projectile Points, 23BE214: Measurements (mm)

Group	Specimen	Total Length	Blade Length	Haft Length	Width Shoulders	Width Haft	Width Base	Thickness Blade	Thickness Haft	Weight (gm)	Angle A (°)	Angle B (°)	Wear[i]	Figure	Remarks
5	6-16	-	-	-	-	-	13	-	-	-	-	-	-		Hinge fracture
	13-9	-	-	-	-	-	16	-	-	-	-	-	-		Heat treated Hinge fracture
7	10-14	-	-	15*	-	-	-	6	6	-	25	50	-	12,a	Heat treated Impact fracture
	13-10	-	-	16*	-	-	-	9	8	-	25	70	Ec	12,d	Heat treated Hinge fracture
8	9-2	35*	22*	13	-	-	-	8	7	-	35	70	U	12,e	Heat treated
12	1-9	-	-	-	-	-	25*	-	8*	-	-	-	-		Heat fracture
	10-1	-	-	17*	-	22*	25	-	7	-	-	-	-	12,f	Impact fracture
	10-2	-	-	14*	-	21*	-	-	7	-	-	-	-	12,c	Heat treated
14	4-1	-	-	-	-	-	23	-	-	-	-	-	-	12,b	Transverse stress fracture, heat treated
17	1-2	-	-	-	-	-	-	-	-	-	30	75	Er		Heat treated
	13-6	-	-	-	-	-	-	-	-	-	20	50	Bu,Er		

TABLE 1: Continued

Projectile Points, 23BE214: Measurements (mm)

Group	Specimen	Total Length	Blade Length	Haft Length	Width Shoulders	Width Haft	Width Base	Thickness Blade	Thickness Haft	Weight (gm)	Angle A (°)	Angle B (°)	Wear[i]	Remarks
19	6-12	-	-	-	-	-	-	-	-	-	30	60	Bu,Er	Heat treated
	6-13	-	-	-	-	-	-	-	-	-	40	75	Bu,Er	Heat treated
20	3-2	-	-	-	-	-	-	-	-	-	-	-	-	
	13-8	-	-	-	-	-	-	-	-	-	-	-	-	

* Estimated complete measurement

i Bu - Bifacial use chip scars
Ec - Edge crushing
Er - Edge rounding
U - Unifacial use chip scars

point distal tips, too small to classify as to blade shape. Both exhibit bifacial use chip scars and edge rounding.

Group 20: Unclassifiable Point Fragments

Two projectile point fragments are included in this group. One is a large thick basal section with lamellar secondary chipping and a straight base formed by longitudinal secondary retouch. The other, a blade segment from near the shoulders of a point, has lightly ground lateral edges.

Drills

Group 21: Expanding Base Drill (Fig. 12, g)

This group is composed of a single, heat treated drill. The haft element juncture is lateral-lateral, resulting in abruptly rounded shoulders and basal corners. The tang has even chipped expanding lateral edges and a straight base formed by bifacial, longitudinal secondary retouch. One basal corner exhibits a burin blow which was partially reworked. The shaft is bi-triangular in transverse cross section, biconvex in longitudinal cross section, and was formed by conchoidal, bifacial-bilateral, continuous secondary chipping; tertiary chipping occurs as bifacial use chip scars and heavy edge rounding with some polish on raised areas. The shaft has a distal hinge fracture. Measurements are given in Table 2.

Group 25: Drill Shafts

Two biface fragments are here classed as drill shafts on morphology and chipping pattern. Both are broken above the shoulders; one has a hinge fracture, the other exhibits a flat transverse fracture. Both shafts were formed by conchoidal, bifacial-bilateral, continuous secondary chipping. One is bi-triangular in cross section, the other is triangulo-convex. One item was heat treated. Measurements are given in Table 2.

TABLE 2

Drills, 23BE214: Measurements (mm)

Group	Specimen	Total Length	Shaft Length	Base Length	Width Shaft	Width Base	Width Haft	Thickness Shaft	Thickness Haft	Weight (gm)	Angle A (°)	Angle B (°)	Wear[i]	Remarks
21	6-7	-	35*	17	7	28	22	6	6	8.9*	-	90	Bu, Er	Fig. 12, g
25	6-8	-	-	-	8	-	-	6	-	-	-	80	Bu, Er	
	10-13	-	-	-	8	-	-	5	-	-	-	90	Bu, Er	Heat treated

* Estimated complete measurement

i Bu-Bifacial use chip scars
Er-Edge rounding

Bifaces

Ten complete bifaces are divided into five groups, based on blade morphology qualified by relative modifiers: thick and thin, large and small. In addition, four groups, composed of 28 specimens, represent medial biface segments, unclassifiable segments, and fragments. Table 3 presents the measurements.

Group 32: Large, Thick, Ovate Bifaces

The single item in this group is a biface with a large, thick, ovate blade with irregular chipped lateral margins, and a convex base which retains cortex on one face. Both cross sections are biconvex. Primary chipping is massive, deep and bifacial; secondary and tertiary chipping is absent. The lack of use suggests the item is a preform.

Group 35: Proximal Biface Segment; Large, Thin, Triangular

One biface basal segment has two lateral, even chipped margins and a slightly convex base. The blade is assumed to have been triangular with a biconvex transverse cross section; the longitudinal cross section is indeterminate. Primary chipping is indeterminate; secondary chipping is conchoidal, bifacial-bilateral, and continuous; tertiary chipping occurs as grinding on the proximal blade margins. The base was formed by bifacial conchoidal secondary retouch and grinding. The distal break is a hinge fracture; the item appears to have been heat treated.

Group 37: Proximal Biface Segments; Large, Thin, Ovate (Fig. 12, i)

Three items in this category are believed to be proximal portions of large, thin ovate bifaces. Blade margins are even chipped, and both cross sections are biconvex. Primary chipping is massive, flat, and bifacial; secondary chipping is expanding, bifacial-bilateral, and continuous;

tertiary chipping occurs as unifacial or bifacial use chip scars and edge rounding. The basal margin is convex, formed by longitudinal secondary retouch on one face, by a single primary retouch flake scar on the opposite face, and by grinding. Two items appear to be heat treated, two have hinge fractures, and one exhibits a transverse stress fracture.

Group 43: Distal Biface Segment; Large, Thin

Two distal biface segments have even chipped lateral margins and large triangular blades with biconvex (1-6) to plano-convex (6-3) transverse cross sections (longitudinal cross sections are indeterminate). Primary chipping is obscured; secondary chipping is lamellar to expanding, bifacial-bilateral, and continuous (6-3 has an irregularly worked margin). Tertiary chipping occurs as use chip scars and edge rounding. Both exhibit flat transverse fractures; neither appears to have been heat treated.

Group 44: Distal Biface Segment; Large, Thick

Three biface segments have even chipped, convex blade margins believed to be portions of ovate blades. Primary chipping is massive, flat, and bifacial; secondary chipping is expanding, bifacial-bilateral (3-10 is bifacial-unilateral), and continuous; tertiary chipping occurs as unifacial use chip scars. Longitudial cross sections are indeterminate; transverse cross sections are biconvex. One has a hinge fracture, the other two show transverse fractures.

Group 45: Medial Biface Segments

This group is composed of two segments of biface blades too small to classify to blade shape. Chipping pattern is within the range of previously described forms. The items are distinguished from medial point segments on the basis of size and chipping pattern. One item exhibits unifacial use

TABLE 3

Bifaces, 23BE214: Measurements (mm)

Group	Specimen	Maximum Length (mm)	Maximum Width (mm)	Maximum Thickness (mm)	Weight (gm)	Angle A (°)	Angle B (°)	Wear[i]	Remarks
32	1-3	86	58	25	139.3	65	na	-	
35	3-11	-	-	-	-	25	60	Gd	Heat treated
37	1-5	-	45	11*	-	20	65	U,Er	Heat treated, Fig. 12, i
	3-3	-	42	8*	-	25	60	U	Heat treated
	10-3	-	47*	8*	-	20	55	Bu,Er	
43	1-6	-	-	-	-	30	60	Bu,Er	
	6-3	-	-	-	-	20	80	U,Er	
44	3-1	-	-	-	-	25	70	U	
	3-10	-	-	-	-	40	70	U	
	6-15	-	-	-	-	30	60	U,Er	
45	3-7	-	-	-	-	35	75	Ec	
	3-8	-	-	-	-	65	75	U,Er	Heat treated
46	10-16	-	-	-	-	35	55	Bu,Er	Two use margins
						45	75	U,Er	
47	1-4	-	-	-	-	20	70	U,Er	Heat treated
	6-5	-	-	-	-	30	55	U	
	6-6	-	-	-	-	45	70	Ec	Heat treated
	6-10	-	-	-	-	25	50	Er	
	6-11	-	-	-	-	-	-	-	Heat shattered
	10-9	-	-	-	-	35	70	U	
	10-10	-	-	-	-	30	65	Bu,Er	
	13-3	-	-	-	-	-	-	Gd	

TABLE 3: Continued

Bifaces, 23BE214: Measurements (mm)

Group	Specimen	Maximum Length (mm)	Maximum Width (mm)	Maximum Thickness (mm)	Weight (gm)	Angle A (°)	Angle B (°)	Wear[i]	Remarks
48	1-1	-	-	-	-	45	70	U	
	1-7	-	-	-	-	30	70	Bu,Er	Heat treated
	1-8	-	-	-	-	15	60	Bu,Er	Heat treated
	3-4	-	-	-	-	20	55	U	
	3-5	-	-	-	-	-	-	U	Heat shattered
	3-6	-	-	-	-	-	-	-	Heat shattered
	6-4	-	-	-	-	-	-	-	Heat shattered
	9-1	-	-	-	-	40	70	Er	
	10-6	-	-	-	-	-	65	Er	Heat shattered
	10-7	-	-	-	-	-	55	Bu	
	10-8	-	-	-	-	35	75	U	Heat treated
	10-9	-	-	-	-	15	60	Ec	
	10-10	-	-	-	-	-	70	Ec	Heat treated
	13-1	-	-	-	-	45	60	Bu	
	13-2	-	-	-	-	25	55	Bu	
	13-4	-	-	-	-	-	-	-	Heat shattered
	13-5	-	-	-	-	-	60	U	Heat treated

* Estimated complete measurement
i Bu - Bifacial use chip scars
Ec - Edge crushing
Er - Edge rounding
Gd - Ground
U - Unifacial use chip scars

chip scars; the other shows manufacture-related edge crushing.

Group 46: Irregular Biface Segment

The single item in this group is part of a biface with an irregular blade, even chipped lateral edges, and a biconvex cross section. Primary chipping is massive, flat, bifacial; secondary chipping is conchoidal, bifacial, along one margin and unifacial on the other; tertiary chipping occurs as bifacial use chip scars on the bifacially chipped margin and unifacial use chip scars on the unifacially worked margin; both margins exhibit edge rounding.

Group 47: Unclassifiable Biface Segments

This group is composed of eight biface segments with one lateral and one basal or distal margin, but are too fragmentary for further classification. Two items appear to have been heat treated; one retains cortex on one face. One item (13-3) has a ground base and may be a fragment of a contracting stem point.

Group 48: Unclassifiable Biface Fragments

Seventeen biface fragments are too incomplete to classify as any of the above categories. Two items appear to be distal fragments; the others are lateral fragments. Nine items were heat treated. Most exhibit wear in the form of use chip scars. Chipping patterns are highly variable.

Bifacially Worked Cobble

Group 51: Bifacially Worked Cobble

The single item in this group is a bifacially worked cobble of colluvial chert. Primary chipping is massive, deep, and bifacial, resulting in an ovoid turtle back with irregular chipped margins and inflated biconvex cross sections. There is no secondary chipping; tertiary chipping

occurs as manufacture-related edge crushing. Length 68 mm; width 61 mm; thickness 34 mm; weight 137.1 gm.

Cores

Group 52: Polyhedral Cores

This group is composed of four complete and 16 fragments of polyhedral cores. Flake scars are irregularly placed over the tool surfaces. Two items retain cortex on one face. None appear to have been used as hammers. Table 4 presents the measurements for complete specimens.

Group 53: Prismatic Cores

One complete specimen exhibits blade-like flake scars suggestive of a prismatic core. All blades were struck parallel to each other, originating from one surface; the striking surface exhibits "U" shaped indentations along its lateral margin. No striking platform preparation is evident (for the blades). The striking surface was prepared by removing a single large flake transverse to the tool's long axis. Measurements are presented in Table 4.

Group 54: Core Flakes

Eight large flakes (two retain some cortex) appear to be core flakes struck to form or rejuvenate a core. All appear to be related to polyhedral cores. Flake scars only occur on the dorsal aspect. Measurements are presented in Table 4.

Utilized Cobble

Group 55: Utilized Chert Cobble

The single item in this category is a circular colluvial chert cobble, biconvex in both cross sections and relatively inflated. One face of the item exhibits a roughly circular pitted and crushed area about 21 mm in diameter and less than 1 mm deep. Length 78 mm; width 75 mm; thickness 38 mm; weight 73.7 gm.

TABLE 4

Cores, Core Flakes, 23BE214: Measurements (mm)

Group	Specimen	Maximum Length (mm)	Maximum Width (mm)	Maximum Thickness (mm)	Weight (gm)	Remarks
52	1	125	34	71	429.6	
	1	93	54	67	311.0	
	1	73	76	59	351.3	
	6-2	75	64	42	222.4	
53	1	75	53	41	185.9	
54	6	73	48	20	38.0	
	3	75	26	19	41.3	Cortical
	3	-	-	17	-	Cortical

Modified Flakes

Group 56: Worked Flakes

Fourteen flakes have one margin modified by retouch to form a working element; one flake is a secondary decortication flake, and the remainder are interior flakes. Four working elements are too fragmentary to classify (Table 5).

One flake has a concave working element, planar in cross section, with angles A and B at 70° and 90°, respectively. Wear occurs as use chip scars and edge rounding. The item could be classified as a spokeshave.

Two flakes exhibit subconcave working elements, planar or subconcave in cross section. Angle A is 45 and 20°; angle B is 85 and 70°. Both exhibit use chip scars; one shows edge rounding.

Straight working elements occur on six flake margins. Cross sections are either subconcave (3) or planar (3). Angle A varies from 20 to 50° (mean: 26.6°); angle B varies from 55 to 80° (mean: 68.3°). Wear occurs as use chip scars (5), one exhibits edge rounding, and one shows no wear.

There is one angular working element in the sample: it was made on a flake on which the entire dorsal surface is modified by retouch, but only the dorsal, angular end exhibits wear (in the form of use chip scars). Angles A and B are 55 and 65°, respectively.

Group 58: Flakes with Fine, Continuous Retouch

Three interior flakes each have one margin which exhibits fine, continuous retouch. Table 5 presents data on this group. Two working elements are straight with planar cross sections; angle A is 30 and 20°, and angle B is 75 and 65°. Both exhibit wear in the form of unifacial use chip scars. One working element is concave in plan view and planar in cross section with angle A at 30° and angle B at 80°. Wear occurs as use chip scars.

TABLE 5

Modified Flakes, 23BE214: Measurements (mm)

Group	Specimen	Maximum Length	Maximum Width	Maximum Thickness	Tool Length	Tool Width	Weight (gm)	Angle A (°)	Angle B (°)	Length Working Element	Plan View Working Element		Cross Section Working Element		Flake Type	Flake Outline	Location of Working Element	Wear
											Nominal	Ratio Scale	Nominal	Ratio Scale				
56	1-10	-	-	-	-	-	-	25	80	24*	St	.0	SCv	.1	I	-	RL,Dr	U, Er
	1-11	-	-	5	-	-	-	20	70	-	St	.0	Pr	.0	I	E	RL,Dr	-
	3-12	29	21	8	20	30	5.2	70	90	8	Cv	-1.5	Pr	.0	I	P	RL,Dr	U, Er
	3-13	-	-	-	-	-	-	55	65	-	Ang	-	Pr	.0	I	-	Ds,Dr	U
	3-15	25	15	2	24	17	.8	-	70	-	-	-	-	-	I	E	Ds,Dr	U
	3-16	-	-	-	-	-	-	35	70	-	-	-	SCx	1.4	I	-	-	U, Er
	3-17	26	25	5	26	25	3.5	50	70	16	St	.0	Pr	.0	I	E	Ds,Dr	U
	3-18	26	22	5	20	25	-	20	65	11	St	.0	SCv	-.6	I	E	LL,V	U
	3-19	-	-	-	-	-	-	20	70	12	St	.0	Pr	.0	I	-	RL,Dr	U
	3-20	-	-	-	-	-	-	25	60	-	-	-	Pr	.0	I	-	Dr	U, Er
	6-9	-	-	-	-	-	-	30	65	-	-	-	-	-	I	-	Dr	-
	6-17	-	-	-	-	-	-	25	55	20	St	.0	SCv	-1.2	I	-	V	U
	10-15	-	-	8	-	-	-	45	85	7	SCv	-.9	Pr	.0	I	E	RL,V	U, Er
	13-11	-	-	5	20	27	-	20	70	18	SCv	-.8	SCx	.8	SD	-	-	U
58	3-26	-	-	-	-	-	-	20	65	11	St	.0	Pr	.0	I	-	LL,Dr	U
	10-16	-	-	-	-	-	-	30	75	13	St	.0	Pr	.0	I	E	RL,Dr	U
	13-12	17	26	3	10	2	1.1	30	80	7	SCv	-1.6	Pr	.0	I	E	Ds,Dr	U
59	1-12	-	27	11	33	27	-	50	75	21	Cx	10.0	Pr	.0	I	P	Ds,Dr	U, Er
	3-21	-	19	4	19	38	-	15	65	21	SCx	2.3	Pr	.0	I	P	LL,V	U, Er
	3-22	-	-	-	-	-	-	30	60	-	-	-	Pr	.0	I	-	Lat,Dr	U
	3-23	-	-	-	12	-	-	40	75	-	-	-	-	-	I	E	RL,Dr	U, Er
		-	-	-	12	-	-	25	50	15	Irg	-	Pr	.0	I	E	LL,V	BU, Er
	3-24	-	-	-	-	-	-	40	75	13	St	0.0	SCx	.9	I	-	-	U, Er
	3-25	28	27	6	26	27	4.2	30	50	17	St	0.0	Pr	.0	I	E	RL,V	U
	3-13	-	20	7	17	49	-	50	65	12	St	0.0	Pr	.0	I	E	RL,Dr	U

Ang. = Angular
B. = Bifacial
BU. = Bifacial Use Flake Scars
C. = Contracting
Cv. = Concave
Cx. = Convex
Dr. = Dorsal
Ds. = Distal
E. = Expanding
Er. = Edge rounding
I. = Interior Flake
Irg. = Irregular
Lat. = Lateral
LL. = Left Lateral
Mr. = Margin
Ov. = Ovate
P. = Parallel
PD. = Primary Decortication Flake
Pr. = Planar
RL. = Right Lateral
SCv. = Subconcave
SCx. = Subconvex
SD. = Secondary Decortication Flake
St. = Straight
Tri. = Triangular
U. = Use Flake Scars
V. = Ventral

Group 59: Utilized Flakes

Seven interior flakes have at least one margin which exhibits use chip scars; one of the flakes has two separate working elements. Two working elements are too fragmentary to classify. Measurements are given in Table 5.

Straight working elements occur on three flake margins; all are planar in cross section. Angle A ranges from 30 to 50° (mean is 40°); angle B varies from 50 to 75°, with a mean of 63.3°. One flake exhibits wear in the form of edge rounding.

One subconvex working element has a planar cross section. Angle A is 15°; angle B is 65°. Wear occurs as edge rounding. There is one convex working element with a planar cross section.

Angles A and B are 50 and 75°, respectively. Edge rounding is present on the flake margin. Both of the above tools may be classified as spokeshaves.

One working element is irregular in plan view and is planar in cross section, with angle A at 25° and angle B at 50°. Wear occurs as bifacial use chip scars and edge rounding.

Bifacial Retouch Flakes

Group 62: Bifacial Retouch Flakes

There are 125 bifacial retouch flakes. Figure 3 is a frequency distribution of flakes by excavation unit. The edge angles cluster in the range of 50 to 80°. However, there appears to be a bimodal distribution of flakes, with one peak at 60° and a second at 70-75°. Bifacial retouch flakes account for 4.4% of all flakes (bifacial retouch flakes plus unmodified flakes).

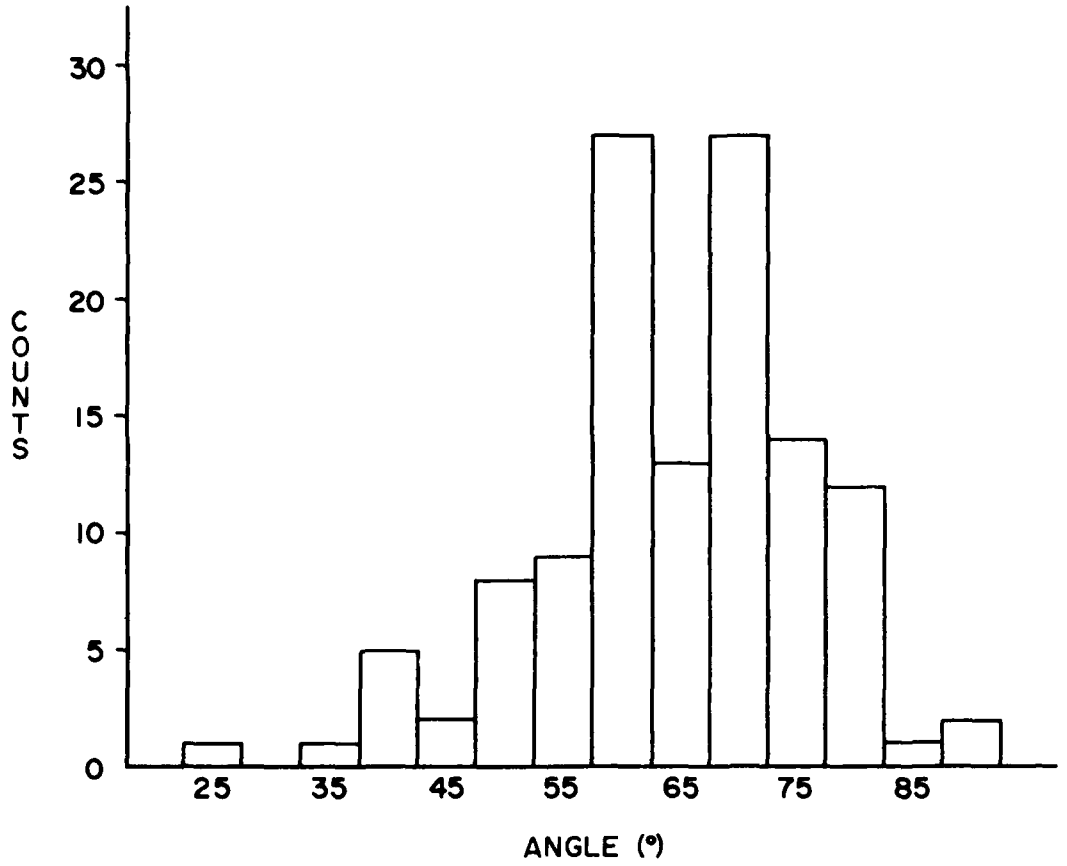

Figure 3. Frequency histogram of bifacial retouch flakes, 23BE214.

GROUND STONE

Group 64: Core-Hammerstone (Fig. 12, h)

A heat treated fossiliferous chert core without cortex shows extensive edge crushing and battering, indicating use as a hammer. It is ovoid to triangular in plan view and triangulo-planar in both cross sections. Measurements are given in Table 6.

Group 65: Hammerstone-Pitted Stone

The single item in this category is a longitudinally broken chert river cobble with several large expanding primary decortication flake scars. Cortex covers about 25% of the tool surface. The lateral edge exhibits pitting and crushing suggesting use as a hammer. One face retains one half of a probably circular pit, about 32 mm in diameter and 3 mm deep. Measurements are presented in Table 6.

Group 68: Mano

A sandstone cobble, rhomboid in plan view and roughly rectangular in cross section, has two lightly ground opposing faces. In addition, two lateral edges show some smoothing. The item may be a utilized fragment of a larger tool. Table 6 presents the measurements for the tool.

Group 71: Ground Hematite

The single item in this category is a piece of weak red (2.5YR4/2), hard, anhydrated hematite. It is roughly trapezoidal in plan view with rectangular cross sections. One surface is heavily ground; the rest of the tool is polished. Table 6 presents measurements for this group.

DEBITAGE

Group 73: Unmodified Flakes, Shatter, and Broken Rock

Table 7 presents the data for these classes of debris. There are 2683 flake-flake fragments: 35 are

TABLE 6

Groundstone, 23BE214: Measurements (mm)

Group	Specimen	Maximum Length (mm)	Maximum Width (mm)	Maximum Thickness (mm)	Weight (gm)	
64	3-9	37	37	19	25.5	Fig. 12, h
65	1-4	86	-	59	-	
68	6-14	66	48	41	181.5	
71	10-12	17	14	3	1.7	

TABLE 7

Distribution of Debitage, 23BE214

	Flakes						Shatter		
	Primary Decortication		Secondary Decortication		Interior				
	W	B	W	B	W	B	Cortical	Interior	Fire Cracked Rock
General Surface	-	-	4	-	4	48	5	15	2
Square 1									
Plow Zone	2	3	6	7	18	292	19	91	4
Subsoil	-	-	-	3	-	-	-	-	-
Square 2									
Plow Zone	3	10	7	13	40	496	30	182	24
Subsoil	-	-	-	-	-	6	1	-	1
Square 3									
Plow Zone	1	8	6	10	39	752	19	224	7
Subsoil	-	-	-	-	1	23	-	9	-
Square 4									
Plow Zone	3	5	13	8	67	787	77	256	6
Subsoil	-	-	-	-	-	2	-	2	-
Totals	9	26	36	38	169	2405	151	779	44

W = Whole

B = Broken

primary decortication flakes, 74 are secondary decortication flakes, and 2574 are interior flakes. Decortication flakes account for 4.1% of the flake sample.

There are 930 pieces of chert shatter, of which 151 or 6.1% retain some cortex.

Broken rock includes only fire cracked quartzite. Forty-four pieces of fire cracked quartzite were recovered; 24 of these were in the plow zone of Square 2, indicating that a possible fire use area there was destroyed by plowing.

HISTORIC EUROPEAN MATERIAL

Group 76: Historic European Materials

Twelve sherds of historic European ceramics were confined to the surface and plow zone of Squares 1, 2, and 3; one sherd is blue pattern featherware; eight are creamware, and one each is of blue stoneware, salt glazed ware, and a brown stoneware jug. Additional historic material includes one horseshoe, 19 square headed nails, two fragments of green bottle glass, and two iror fragments. All historic material is ascribable to late 19th and early 20th century contexts (Nŏel-Hume 1969).

Discussion

INTRASITE COMPARISON

The vertical distribution of artifacts at Pippens (Table 8) is dominantly confined to the plow zone—only one artifact (Group 14), two bifacial retouch flakes, and less than 1.5% of the debitage and shatter were in the subsoil. Thus, the major part of the site, at least in the areas tested, has been destroyed by plowing.

The point forms and drill base are indicative of a mixture of early ceramic and preceramic components in the

plow zone. Contracting stem points (Group 5) have a suggested temporal duration of from AD 1 to 1000/1200 (Chomko 1976: 99-100). Side-notched points (Groups 7 and 8) have been recovered in preceramic contexts at two nearby stratified sites: Blackwell Cave (Falk 1969: 53, Table 8) and Phillips Spring (Chomko 1976: 93). Corner-notched points similar to the Group 12 specimens occur in preceramic contexts; Wood and McMillan (1969: Fig. 2) suggest a temporal span of 1500 BC to AD 500. The expanding base drill is apparently a reworked projectile point similar to Rice point forms, which tend to be associated with ceramics (Vehik 1974: 50). The single, possibly diagnostic artifact in the subsoil (the Group 14 point base) is similar to basal forms on Dalton points (McMillan 1971) and may indicate an early component in the eastern part of the site.

The suggested temporal span for the major portion of the occupation, based on point forms, is from about 3500 to 1000 BP. The lack of ceramics suggests an earlier terminal date (about 2000 BP, based on the appearance of ceramics at Phillips Spring after 1950 BP, Chomko 1976: 109).

Discussion of the horizontal distribution of material is limited due to the small area excavated, compared to the total site area (somewhat less than .1% of the site was tested).

The categories of tool types may indicate the activities that took place at the site. Projectile points (Groups 5 to 20) are indicative of hunting-butchering activities. The bifaces, worked and utilized flakes, and flakes with fine, continuous retouch (Groups 35, 37, 43-48, 56, 58 and 59) exhibit wear indicative of cutting and scraping, generally associated with hide and/or wood working. The drills (Groups 21 and 25) may be associated with wood or hide working (as perforators).

TABLE 8

Distribution of Artifacts by Provenience, 23BE214

		Square 1		Square 2		Square 3		Square 4		
Group	General Surface	Plow Zone	Subsoil	Plow Zone	Subsoil	Plow Zone	Subsoil	Plow Zone	Subsoil	Totals
5				1				1		2
7						1		1		2
8						1				1
12	1					2				3
14			1							1
17	1							1		2
19				2						2
20		1						1		2
21				1						1
25				1		1				2
32	1									1
35		1								1
37	1	1				1				3
43	1			1						2
44		2		1						3
45		2								2
46						1				1
47	1			4		2		1		8
48	3	3		1		6		4		17
51						1				1
52	8	2		3		4		3		20
53	1									1
54		1		2						3
55								1		1

TABLE 8: Continued

Distribution of Artifacts by Provenience, 23BE214

		Square 1		Square 2		Square 3		Square 4		
Group	General Surface	Plow Zone	Subsoil	Plow Zone	Subsoil	Plow Zone	Subsoil	Plow Zone	Subsoil	Totals
56	2	8		2		1		1		14
58		1				1		1		3
59	1	5						1		7
62		25		35		48	2	15		125
64		1								1
65	1									1
68				1						1
71						1				1

Stone working is indicated by the cores, core flakes, core-hammerstone, and debitage (Groups 52-54, 64, and 73). The low percentage of decortication to interior flakes suggests stone working largely involved the reduction of premodified raw materials (i.e., preforms); only one biface type (Group 32) is interpreted as a preform. At sites with comparable data (Miller Site and Saba Shelter [Vehik 1974] and the other sites in this report), bifacial retouch flakes occur in the second highest percentage of all unmodified flakes at the Pippens Site. They may be interpreted as indicating tool sharpening and preform reduction (Vehik 1974: 64).

The mano (Group 68) is generally associated with vegetal food processing, while the pitted stone (Group 65) is associated with nut processing. Finally, the ground hematite (Group 71) is indicative of pigment processing activities.

INTERSITE COMPARISON

The two contracting stem points with concave bases (Group 5) are within the range reported for Langtry points (Bell 1958: 38-39). Similar points have been recovered in ceramic contexts at the Fulton Site (Lippincott 1972: 12-13, 49), the Merideath Site and Blackwell Cave (Falk 1969: 33-34, 80), the Thurman Site (Falk and Lippincott 1974: 49), the Miller Site and Saba Shelter (Vehik 1974: 22-24, 104-107), Rodgers Shelter (McMillan 1965: 362, 365 and 1966: 49), Phillips Spring (Chomko 1976: 32, 90-93) and the Lindley Focus of the Highland Aspect (Wood 1961: 104). The temporal span of Langtry points in the western Ozarks is about AD 1 to 1000/1200 (see Chomko 1976: 99-100).

Side-notched points (similar to Groups 7 and 8) are reported from Stratum IV at Rodgers Shelter (McMillan 1965)

and in preceramic contexts at Blackwell Cave (Falk 1969: 53, 86-87, Table 8) and Phillips Spring (Chomko 1976: 93). Side-notched point forms are rare in stratified sites in the reservoir area but are reported from surface collections (Chapman 1954). In central Missouri, Logan (1952) and Klippel (1971) report side-notched forms in both Archaic and Woodland strata at Graham Cave.

The Group 12 specimens (corner-notched with a convex base) are similar to relatively wide notched forms from preceramic contexts at Blackwell Cave (Falk 1969: 86), the Fulton Site (Lippincott 1972: 47-48), Rodgers Shelter (McMillan 1965 and 1966) and Phillips Spring (Chomko 1976: 93, 100-101). Corner-notched point forms tend to have a long temporal duration in the western Ozarks, but a separation of forms based on the width of the notch (see Falk and Lippincott 1974: Lippincott 1972; Vehik 1974; and Chomko 1976) suggest the wide notched varieties occur early (preceramic). Wood and McMillan (1969: Fig. 2) suggest similar forms have associated dates of 1500 BC to AD 500.

The Group 14 specimen (expanding stem with a concave base), although too fragmentary to permit positive comparison with other described forms, is reminiscent of the basal configuration on Dalton points (McMillan 1971: Fig. 47). However, the specimen appears to have been heat treated, a manufacturing technique generally associated with later cultural periods (Klippel 1970).

The expanding base drill (Group 21) is comparable to a specimen from Saba Shelter which Vehik (1974: 50) suggests is a reworked shallow side-notched point ("Rice Side-Notched," as defined by Bray 1956: 127), of a kind typically associated with ceramics. The Pippens Site specimen closely resembles the basal form on a corner-notched point from Beck Shelter (this report), which may be a variant of the Rice side-notched form.

Summary and Recommendations

The major occupation at Pippens took place between about 3500 to 2000 BP, although a possible earlier component may be present. Activities carried out at the site include hunting-butchering, hide and wood working, reduction of pre-modified lithic materials, tool sharpening, vegetal food processing, and pigment processing.

Since plowing has resulted in the destruction of original artifact relationships for most of the site, no further work is recommended.

23HI241

This site is on a terrace remnant on the right (east) bank of the Pomme de Terre River at an elevation of approximately 212 m (Fig. 4). The legal designation is the NE¼NE¼NE¼ of Sec. 15, T38N, R22W, Fristoe Quadrangle (U.S.G.S. 15 minute series). Phillips Spring is 915 m to the north and Beck Shelter is 640 m to the south.

Cultural material was scattered over a low rise on a terrace remnant which is believed to be part of Terrace 1b as defined by Haynes (1976). The uplands border the site to the east and extend to the Pomme de Terre River at the southern margin of the site at the junction of an unnamed intermittent feeder creek and the river; the river borders the site to the west. There is oak-hickory forest along the river edge and a post oak-jack oak association covers the hillslope.

At the time of survey and testing the terrace had been plowed and recently rained on, providing good conditions for survey. A surface collection was used to define the northern site limits. Two excavation units, 1.5 x 1.5 m, were dug on the top of the rise and on its eastern slope. The plow zone was removed as a single unit and a 10 cm thick level was excavated into subsoil; subsequent levels, 20 cm in depth, were dug in the 1 m^2 in the southwest corner of the larger excavation units. All back fill was screened through ¼ inch hardware cloth.

Stratigraphy

Three stratigraphic units are recognized at the site: descriptions were taken at the south profile of Square 1. The upper horizon, a plow zone (A_p) extends to 23 cm below

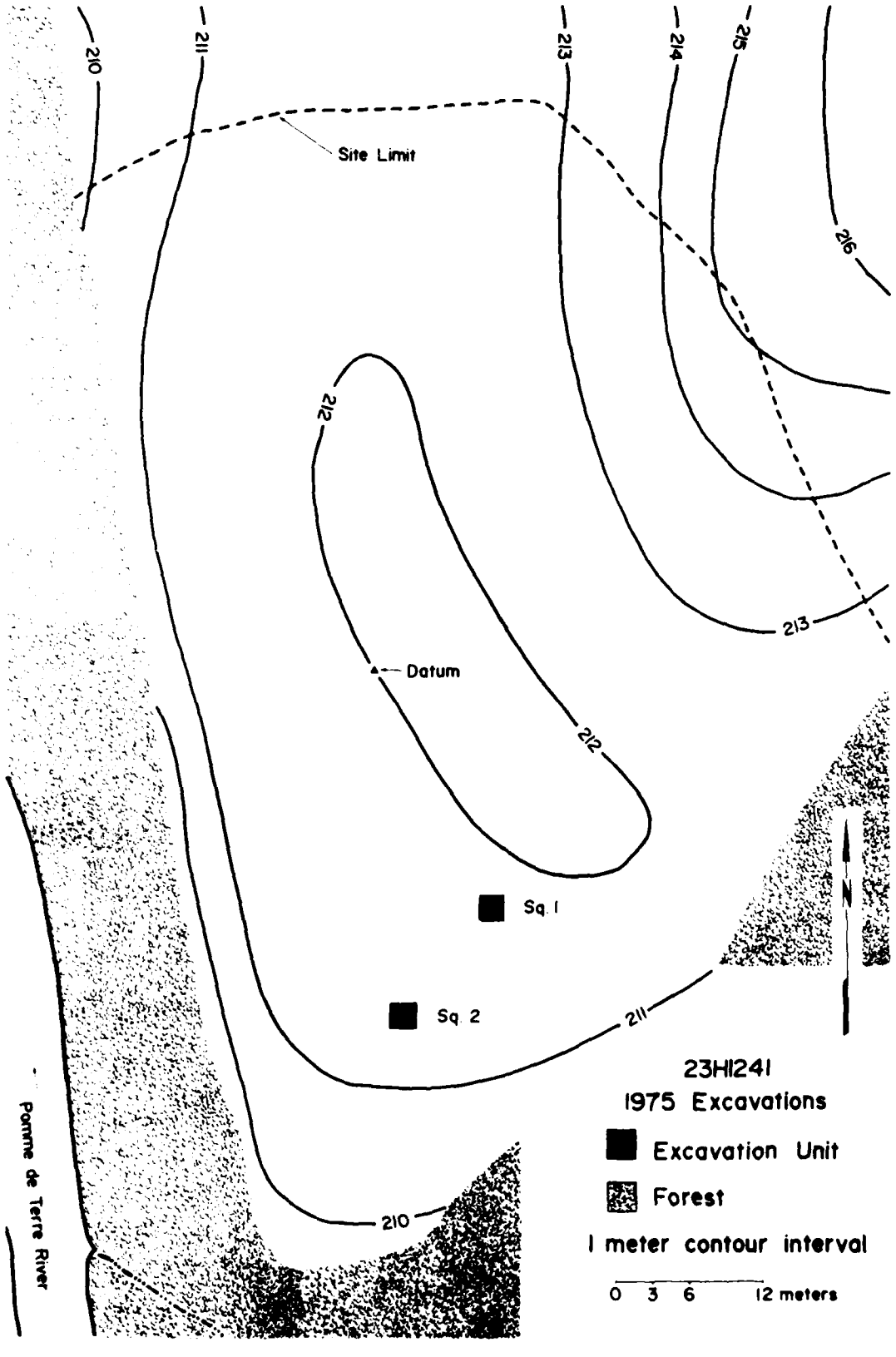

Figure 4. Site 23HI241.

the surface. It is a structureless, dark yellowish brown (10YR3/4) clayey silt with cultural material abundant throughout. The underlying unit (B_2) is a fine subangular blocky, brown (10YR5/3) clayey silt with charcoal flecks and cultural material; the lower boundary of the horizon is diffuse. The lowest unit (B_{2t}) reached in the test squares extends from 36 to 95 cm below the surface, and is a fine subangular blocky, mottled yellowish brown (10YR4/4) silty clay. Charcoal flecks and cultural material are present near the top of the unit but become rarer with depth, until essentially sterile deposits are reached at 75 cm below surface. Soil samples were taken from all three strata but failed to yield any material other than a few flakes and minute fragments of charcoal.

Cultural Remains

CHIPPED STONE

Projectile Points

The 12 projectile points are divided into 4 groups, based primarily on basal morphology and blade form. The points include two groups representing arrow points (Groups 1B and 2) and two groups of projectile points; additional categories include projectile point blades and fragments too small to classify. Measurements are given in Table 9.

Group 1B: Small Triangular Projectile Points, Variant B (Fig. 13,d)

One longitudinally fractured point has a triangular blade with slightly convex, even chipped, blade margins and a concave base. There is no haft element. The longitudinal cross section is biconvex; transverse cross section is indeterminate. Primary chipping is absent (or obscured); secondary chipping is lamellar to expanding, continuous,

bifacial and presumed to be bilateral; tertiary chipping is in the form of bifacial use chip scars. The concave base was formed by longitudinal, unifacial secondary retouch. The point is distinguished from the Variant A small triangular points from Beck Shelter (this report) by its thickness; although not complete enough for accurate measurement, it exceeds 6 mm in thickness as compared to a mean of 2.7 mm for the Variant A forms.

Group 4: Small Corner Notched Points (Fig. 13, a-c)

One complete and three broken points are included in this category; in addition, three haft elements and one medial point segment are included based on morphology and chipping pattern. Blade form is triangular with even chipped, straight lateral margins and biconvex cross sections (2-12 has a concavo-convex longitudinal cross section). Primary chipping is absent; all points appear to have been made from flakes. Secondary chipping is bifacial-bilateral (2-12 is bifacial-unilateral and unifacial on the opposite side), conchoidal, and continuous. Only two items (2-11 and 2-12) exhibit tertiary chipping in the form of unifacial use chip scars and edge rounding. Haft element juncture is lateral-basal and results in pronounced angular shoulders. The tang has even chipped, expanding lateral edges and a straight base (2-11 has a convex basal margin). The base was formed by longitudinal, bifacial secondary retouch. One point is complete, one is impact fractured, one exhibits a longitudinal stress fracture, four show transverse stress fractures, and one is heat shattered. Four points appear to have been heat treated.

Group 10: Corner Notched Projectile Point, Concave Base (Fig. 13, e-f)

One intact and one complete point (except for a

shoulder and basal corner) are included in this category. Blades are ovate with convex, even chipped lateral margins and have biconvex cross sections. Primary chipping is obscured or absent; secondary chipping is lamellar, bifacial-bilateral, and continuous; tertiary chipping occurs as bifacial use chip scars and edge rounding (1-21) or unifacial use chip scars only (2-13). Haft element juncture is lateral-basal with pronounced angular shoulders. The tang has markedly expanding, even chipped lateral margins and a slightly concave base formed by bifacial longitudinal secondary retouch and grinding. Both points appear to have been reworked from larger-bladed forms suggesting they are not arrowpoints (the hypothesized larger form would be outside the accepted size-weight range for arrowpoints). Specimen 2-13 was heat treated.

Group 13: Expanding Stem Points; Convex Base (Fig. 13, i)

One point, complete except for one shoulder, makes up this category. The blade is excurvate with even chipped lateral edges and biconvex cross sections. Primary chipping is massive, flat, and bifacial; secondary chipping is lamellar, unifacial-unilateral, continuous, with expanding secondary chipping scars on the remaining faces. Tertiary chipping occurs as bifacial use chip scars and heavy edge rounding. Haft element juncture is lateral-basal and results in pronounced angular shoulders. The tang has slightly expanding lateral edges and a slightly convex base formed by longitudinal, unifacial secondary retouch.

Group 19: Distal Point Segments

Two distal biface fragments are believed to be portions of projectile points with even chipped blade edges which converge at a relatively wide angle (approximately 35°). Primary chipping is obscured; secondary chipping is lamellar to expanding, bifacial-bilateral, and continuous; tertiary

TABLE 9

Projectile Points, 23HI241: Measurements (mm)

Group	Specimen	Total Length	Blade Length	Haft Length	Width Shoulders	Width Haft	Width Base	Thickness Blade	Thickness Haft	Weight (gm)	Angle A (°)	Angle B (°)	Wear[i]	Figure	Remarks
1B	9-10	27	27	na	na	na	-	6*	na	-	40	60	BU	13,d	Heat treated Longitudinal break
4	2-7	-	-	6	-	5	6	4	3	-	35	60	-	13,b	Longitudinal break
	2-8	-	-	4	-	4	7	3	2	-	35	50	-		Heat treated Impact fracture
	2-9	-	-	-	-	6	9	-	3	-	-	-	-		Transverse stress fracture
	2-10	-	-	-	-	5	10*	-	3	-	-	-	-		Heat treated
	2-11	24	17	7	11	5	9	3	3	.7	30	40	U,Er	13,c	Serrated blade margins
	2-12	-	19	-	18	6	-	4	-	-	30	60	BU,Er	13,a	Heat treated transverse stress fracture
	4-7	-	-	-	-	-	10	-	3*	-	-	-	-		Transverse stress fracture
	7-14	-	-	-	15	7	-	-	3	-	-	-	-		Heat fractured
10	1-21	42	31	11	-	16	-	6	4	7.6*	30	65	BU,Er	13,e	Reworked
	2-13	38	31	7	22	13	18	5	5	3.9	30	60	U	13,f	Heat treated
13	4-1	85	71	14	38*	16	17	11	8	29.5	35	60	BU,Er	13,i	

TABLE 9: Continued

Projectile Points, 23HI241: Measurements (mm)

Group	Specimen	Total Length	Blade Length	Haft Length	Width Shoulders	Width Haft	Width Base	Thickness Blade	Thickness Haft	Weight (gm)	Angle A (°)	Angle B (°)	Wear[i]	Figure	Remarks
19	4-16	-	-	-	-	-	-	-	-	-	30	70	BU,Er		Hinge fracture
	7-12	-	-	-	-	-	-	-	-	-	30	65	BU,Er		
20	2-6	-	-	-	-	-	-	-	-	-	-	-	-		
	3-3	-	-	-	-	-	-	-	-	-	-	-	-		
	7-10	-	-	-	-	-	-	-	-	-	-	-	-		
	7-11	-	-	-	-	-	-	-	-	-	-	-	-		Heat treated
	9-8	-	-	-	-	-	-	-	-	-	-	-	-		
	9-9	-	-	-	-	-	-	-	-	-	-	-	-		

* Estimated complete measurement
na Not applicable
i BU - Bifacial Use chip scars
Er - Edge rounding
U - Unifacial use chip scars

chipping occurs as bifacial use chip scars and edge rounding. One point (7-4) appears to have been heat treated; one has a proximal hinge fracture and the other exhibits an irregular transverse brake.

Group 20: Unclassifiable Point Fragments

Six distal biface fragments are believed to be portions of projectile points. All are too fragmentary to classify as to blade shape or edge configuration. One item (7-11) was heat treated: three show transverse stress fractures, two show hinge fractures, and one is irregularly fractured. Two fragments (2-6, and 3-3) may be parts of arrowpoints. The items are too incomplete for accurate edge angle measurements.

Drills

Group 22: Rectangular Based Drill (Fig. 13, g)

One drill, with a broken shaft, has a roughly rectangular base. Primary chipping is obscured; secondary chipping is conchoidal to expanding, bifacial-bilateral, and continuous on both the base and the shaft. Tertiary chipping occurs as edge rounding and use chip scars. The shaft was broken as the result of a flake hinge fracture; whether the flake was being removed intentionally or as a result of use is indeterminate. The tool is heat treated. Length, indeterminate; haft length, 24 mm; haft width, 32 mm; haft thickness, 9 mm; shaft width, 8 mm; and shaft thickness, 4 mm.

Bifaces

Three complete and 18 biface segments are divided into 10 groups based on blade outline and basal morphology. In addition, two groups represent unclassifiable biface fragments and segments. Table 10 presents measurements.

Group 28: Large, Thick, Triangular Bifaces; Irregular Blade Margins (Fig. 14, h)

Two complete specimens are included in this category. Blade form is triangular with irregularly chipped blade margins, biconvex cross sections, and a slightly convex base. Primary chipping is massive, deep, bifacial; secondary chipping is sporadic, small, conchoidal. Tertiary chipping occurs as edge crushing, apparently a result of manufacturing. One item (1-9) exhibits a few small conchoidal secondary chipping scars and unifacial use chip scars on a short portion (47 mm) of one lateral edge; one is heat treated; and one retains some cortex on the distal end. The general lack of wear and the absence of secondary chipping scars suggest the items are preforms.

Group 30: Triangular Biface; Irregular Chipped Edge (Fig. 13, h)

A single complete biface has a triangular blade with irregularly chipped lateral margins, roughly biconvex cross sections, and a concave base. Primary chipping is obscured; secondary chipping is expanding to conchoidal, bifacial-bilateral, and continuous (becoming more even and regular near the distal end); tertiary chipping is bifacial use chip scars and edge crushing. The tool may have been burned prior to reaching its final form.

Group 33: Shouldered Biface (Fig. 13, j-k)

Two distally broken bifaces have one lateral edge worked to a shoulder-like prominence. One item has contracting lateral edges, the other is parallel-sided. Primary chipping is obscured; secondary chipping is expanding to conchoidal, bifacial-unilateral and unifacial on the opposite edge, continuous (the unifacially worked edge is steep, about 75°). The shoulders are formed by similar secondary chipping. Tertiary chipping occurs as unifacial

use chip scars (1-17) or edge crushing and light grinding (7-7). One item (1-17) has plano-convex cross sections; the other has biconvex cross sections. Neither is heat treated.

Group 35: Proximal Biface Segments; Large, Thin Triangular Biface (Fig. 14, b,d)

Three proximal biface segments appear to be portions of bifaces with large triangular blades with even chipped blade margins and a slightly convex base. Cross sections are biconvex and thin (deflated). Primary chipping is obscured; secondary chipping is expanding to lamellar, bifacial-bilateral, and continuous; tertiary chipping occurs as bifacial use scars on one specimen. The base was formed by bifacial secondary retouch and grinding. One item exhibits a hinge fracture, one is heat shattered, and one has an irregular fracture.

Group 36: Proximal Biface Segments; Large, Thick Triangular

Two proximal segments of bifaces believed to have large, thick triangular blades with irregularly chipped margins are included in this group. Primary chipping is massive, deep, bifacial; secondary chipping is sporadic, small, conchoidal. Tertiary chipping occurs as edge crushing (related to manufacture). One item is heat treated and exhibits a transverse stress fracture; the other, not heat treated, exhibits a hinge fracture.

Group 37: Proximal Biface Segment; Large, Thin Ovate

This group is represented by a proximal portion of a biface with an ovate blade, biconvex in both cross sections, with one even chipped and one irregularly chipped lateral margin and a pronouncedly convex base. Primary chipping is massive, flat, and bifacial; secondary chipping is expanding to conchoidal, bifacial-bilateral, and discontinuous (part of one lateral edge exhibits small conchoidal continuous

secondary chipping scars); tertiary chipping occurs as edge crushing. The item exhibits a distal transverse stress fracture.

Group 43: Distal Biface Segment; Large, Thin

Two distal biface segments have even chipped lateral blade edges with biconvex cross sections. Primary chipping is obscured; secondary chipping is expanding, bifacial-bilateral, and continuous; tertiary chipping occurs as bifacial use and edge rounding. One exhibits a transverse stress fracture; the other is heat fractured.

Group 44: Distal Biface Segment; Large, Thick

This group is composed of three distal biface segments, with even chipped convex blade edges which converge to a blunt point. Primary chipping is obscured; secondary chipping is conchoidal to lamellar, bifacial-bilateral, and continuous. Longitudinal cross sections are indeterminate; transverse cross sections are biconvex. One item (1-18) has a battered distal end; two appear to have been heat treated; two show transverse stress fractures; and one has a hinge fracture.

Group 45: Medial Biface Segments

Four medial segments of large, triangular to ovate bifaces have even chipped lateral edges, and biconvex transverse cross sections. Primary chipping is massive, flat, and bifacial (2-4 is obscured); secondary chipping is conchoidal to lamellar, bifacial-bilateral, and continuous; tertiary chipping ranges from bifacial use chip scars to edge crushing. None appear to be heat treated.

Group 46: Irregular Biface Segments

One distally broken biface has an irregular blade outline with even chipped blade margins. The longitudinal cross section is biconvex, the transverse cross section is

TABLE 10

Bifaces, 23HI241: Measurements (mm)

Group	Specimen	Maximum Length	Maximum Width	Maximum Thickness	Weight (gm)	Angle A (°)	Angle B (°)	Wear[i]	Remarks
28	1-8	100	69	27	135.2	65	na	-	Cortex on distal end, Fig. 14, h
	1-9	111	53	15	118.9	70	na	-	Heat treated
30	10-1	51	29	8	10.2	40	60	BU,Ec	Heat treated, Fig. 13, h
33	1-17	-	37*	9*	-	75	75	U,Ec	Fig. 13, k
	7-7	-	22*	9	-	50	75	Gd	Fig. 13, j
35	1-16	-	38	7	-	20	-	-	Fig. 14, b
	4-2	-	38	9	-	20	45	BU,Er	Fig. 14, d
	9-7	-	51	9	-	20	-	-	
36	1-10	-	64*	25	-	60	na	-	Heat treated
	1-11	-	-	19	-	45	na	-	
37	1-12	-	57*	12	-	50	70	Ec	
43	1-20	-	-	-	-	15	45	BU,Er	
	7-9	-	-	-	-	15	55	BU,Er	Heat fractured
44	1-18	-	-	-	-	30	70	U	Heat treated
	1-19	-	-	-	-	40	55	U	Heat treated
	7-8	-	-	-	-	40	65	Ec	
45	1-15	-	-	-	-	30	60	BU,Er	
	2-4	-	-	-	-	40	45	Ec	
	7-6	-	-	-	-	30	65	Ec	
	8-5	-	-	-	-	40	70	U,Ec	
46	2-5	-	42	12	-	40	na	-	Heat treated
47	1-13	-	-	-	-	45	70	Ec	
	1-14	-	-	-	-	30	70	Ec	

TABLE 10: Continued

Bifaces, 23HI241: Measurements (mm)

Group	Specimen	Maximum Length	Maximum Width	Maximum Thickness	Weight (gm)	Angle A (°)	Angle B (°)	Wear[i]	Remarks
	2-3	-	-	-	-	50	70	U,Er	Heat treated
	8-3	-	-	-	-	30	65	U	Heat treated
	8-4	-	-	-	-	30	60	U,Er	
48	1-3	-	-	-	-	-	-	Ec	Heat treated
	1-4	-	-	-	-	30	65	U	Heat treated
	2-1	-	-	-	-	55	75	BU	
	3-1	-	-	-	-	-	-	-	Heat treated
	4-5	-	-	-	-	25	50	U	
	7-2	-	-	-	-	-	-	U	Heat treated
	7-3	-	-	-	-	45	75	-	Heat treated
	7-4	-	-	-	-	-	-	-	
	8-2	-	-	-	-	-	70	Ec,Er	
	9-2	-	-	-	-	35	60	Ec	Heat treated
	9-3	-	-	-	-	65	na	-	
	9-5	-	-	-	-	30	50	U	Heat treated

* Estimated complete measurement
na Not applicable
i BU - Bifacial Use chip scars
Ec - Edge crushing
Er - Edge rounding
Gd - Ground
U - Unifacial use chip scars

plano-convex. Primary chipping is massive, deep, and bifacial; secondary chipping is angular expanding, bifacial-bilateral, and highly sporadic. Tertiary chipping occurs as edge crushing. The tool was heat treated.

Group 47: Unclassifiable Biface Segments

Five biface segments have part of one lateral margin and an adjoining basal, distal, or lateral margin, but are too fragmentary to classify. Chipping is variable but in the range of bifaces recorded above. Wear ranges from unifacial use to edge crushing. Two items were heat treated.

Group 48: Unclassifiable Biface Fragments

Twelve biface fragments, seven of which are heat treated, are portions of blade margins or basal edges too small to classify. All show secondary chipping or retouch.

Bifacially Worked Cobble

Group 51: Bifacially Worked Cobble

The one bifacially worked chert river cobble is roughly rectangular in plan view, with compressed biconvex cross sections. A few massive, deep, primary decortication flakes were removed from both faces. The tool may be a discarded core. Length, 65 mm; width, 50 mm; thickness, 25 mm; weight, 86.1 gm.

Cores

Group 52: Polyhedral Core Fragments

Four chert fragments, one with some cortex, are included in this category. All are irregularly shaped, with random flake scars over their surfaces, and are believed to be portions of larger cores. No measurements are presented.

Group 54: Core Flakes

Five interior and two secondary decortication flakes (cortex on proximal end) are included in this category. All

TABLE 11

Core Flakes, 23HI241: Measurements (mm)

Specimen	Maximum Length	Maximum Width	Maximum Thickness	Weight (gm)	Remarks
1-6	80	63	30	148.1	
1-7	123	76	43	422.8	Cortical
1-	75	41	16	57.0	
1-	56	39	15	37.5	
2-	-	30	29	51.0	
8-	80	79	33	96.0	Cortical
9-	69	44	27	81.5	

have a few flake scars on their dorsal surface. Table 11 presents data on this group.

Modified Flakes and Shatter

Group 56: Worked Flakes

Three flakes with one margin modified by purposeful retouch are in the sample. Two working elements are on interior flakes and one is on a secondary decortication flake. Data on this group are presented in Table 12.

Group 57: Worked Shatter

Two pieces of cortical shatter have one margin modified by purposeful retouch to form a convex or subconvex working element. Measurements are presented in Table 12.

Group 58: Flakes with Fine, Continuous Retouch

Nine flakes have at least one margin (two have two margins) which exhibit fine continuous retouch. Six working elements are on interior flakes and five are on secondary retouch flakes. Table 12 gives their measurements.

One flake has a concave working element, planar in cross section, with Angle B at 70° (Angle A not measurable). Wear occurs as use chip scars. The item could be classified as a spokeshave.

Subconcave working elements occur on four flake margins; three are planar and one is subconcave in cross section. Angle A varies from 20 to 40° (mean of 28.8°); Angle B ranges from 65 to 75° (mean of 70°). All exhibit use chip scars and two show edge rounding.

Three straight working elements have subconvex (n=2) or planar cross sections. Angle A varies from 25 to 30°, with a mean of 26.7°; Angle B varies from 65 to 75°, with a mean of 70°. Wear in the form of use chip scars occurs on all specimens; one exhibits edge rounding.

A single subconvex working element has a planar cross section. Angles A and B are 45 and 85°, respectively. Wear is present as both use chip scars and edge rounding.

Two flake margins exhibit angular working elements with planar cross sections. Angle A is 25° and Angle B is 70° on both specimens; both exhibit use chip scars. These could be classified as gravers, or flakes with graver spurs.

Group 59: Utilized Flakes

Thirteen flakes have utilized margins, and an additional flake has two utilized margins. Flake types are: one primary decortication, four secondary decortication, and nine interior flakes. All exhibit use chip scars (by definition). Table 12 presents measurements for this group.

There are seven subconcave working elements, ranging from subconcave (n=2), planar (n=4), to subconvex (n=1) in cross section. Angle A varies from 15 to 55° (mean of 27.8°); Angle B, from 50 to 80° (mean of 68.6°). Only one working element exhibits edge rounding.

Four straight working elements are planar (n=2) or subconvex (n=2) in cross section. Angle A ranges from 10 to 20° (mean of 15°); Angle B, from 40 to 65° (mean of 53.8°). One working element exhibits edge rounding.

Subconvex working elements are present on three flake margins and are subconcave (n=1) or planar (n=2) in cross section. Angle A varies from 20 to 40°, with a mean of 31.7°; Angle B, from 65 to 70°, with a mean of 68.3°. Two show edge rounding.

One flake has a convex working element with a subconvex cross section, and Angles A and B at 25 and 50°, respectively. It exhibits edge rounding.

TABLE 12

Modified Flakes and Shatter, 23HI241: Measurements (mm)

Group	Specimen	Maximum Length	Maximum Width	Maximum Thickness	Tool Length	Tool Width	Weight (gm)	Angle A (°)	Angle B (°)	Length Working Element	Plan View Working Element		Cross Section Working Element		Flake Type	Flake Outline	Location of Working Element	Wear
											Nominal	Ratio Scale	Nominal	Ratio Scale				
56	1-22	-	31	6	37	43	-	15	70	21	Cv	-3.0	Pr	.0	I	E	LL,Dr	U, Er
	2-15	-	-	-	-	-	-	30	70	-	SCx	-	SCx	-	SD	-	LL,V	U
	8-7	-	-	-	-	-	-	30	70	-	St	.0	SCv	-	I	-	-	U
57	3-4	na	na	na	-	-	-	20	70	20	SCx	3.0	Pr	.0	Cort	na	na	U
	4-8	na	na	na	-	-	-	50	70	30	Cx	4.5	SCv	-2.1	Cort	na	na	U
58	2-16	49	42	8	46	51	16.8	25	70	19	Ang	5.0	Pr	.0	I	C	LL,V	U
	2-17	33	26	4	24	35	3.4	20	65	17	SCv	-1.9	Pr	.0	SD	E	LL,Dr	U
		-	-	-	26	32	-	25	75	15	St	.0	SCx	.6	-	-	RL,V	U, Er
	2-18	48	26	10	26	48	8.3	30	65	17	SCv	-1.8	SCv	-1.3	SD	C	LL,V	U, Er
		-	-	-	24	49	-	25	75	23	SCv	-2.3	Pr	.0	-	-	RL,Dr	U
	2-19	46	35	10	45	43	12.6	25	70	24	Ang	-2.3	Pr	.0	I	E	RL,Dr	U
	7-15	-	-	-	-	-	-	25	70	-	St	.0	SCx	-	I	-	Lat,Dr	U
	7-16	-	-	-	-	-	-	-	70	11	Cv	-2.0	Pr	.0	I	-	-	U
	7-17	31	28	9	30	28	6.6	30	65	6	St	.0	Pr	.0	I	C	Ds,Dr	U
	8-8	34	31	11	31	34	10.8	45	85	21	SCx	1.3	Pr	.0	I	P	RL,V	U, Er
	9-11	40	28	13	25	39	11.9	40	75	16	SCv	-1.1	Pr	.0	SD	P	RL,V	U, Er
59	2-20	-	-	-	22	-	-	25	65	15	SCv	-1.9	Pr	.0	I	-	Lat	U
	2-21	48	40	12	38	49	10.5	25	80	22	SCv	-3.5	Pr	.0	SD	E	RL,V	U
	2-22	27	26	6	24	36	4.1	35	65	26	SCx	2.7	SCv	-1.5	SD	C	LL,Dr	U, Er
	2-23	30	27	5	20	39	3.1	15	70	18	SCv	-1.3	SCv	-.9	SD	C	LL,V	U
	2-24	42	22	5	22	45	4.4	25	50	36	Cx	7.0	SCx	1.9	I	D	LL,Dr	U, Er
	2-25	47	35	8	38	41	11.8	55	75	26	SCv	-1.4	Pr	.0	I	C	Ds,V	U
	2-26	-	12	2	12	-	-	15	60	-	St	.0	Pr	.0	I	C	RL,Dr	U, Er
	2-27	30	25	4	23	33		15	65	20	St	.0	Pr	.0	I	E	Ds,Dr	U
		-	-	-	25	31	2.5	30	70	11	SCv	-1.6	Pr	.0	-	-	LL,V	U, Er
	4-9	34	22	4	21	38	2.8	20	50	23	SCv	-1.3	SCx	1.9	I	P	RL,Dr	U
	5-2	61	27	6	26	61	7.9	20	40	45	St	.0	SCx	1.0	I	E	RL,Dr	U, Er
	7-18	-	30	5	28	-	-	25	70	-	SCv	-	SCv	-	I	E	LL,V	U
	7-19	27	31	4	27	25	2.5	10	50	17	St	.0	SCx	.6	I	E	LL,Dr	U
	7-20	16	14	3	14	18	.4	40	70	16	SCx	1.3	Pr	.0	SD	C	RL,Dr	U, Er
	7-21	-	-	4	25	33*	-	20	70	27	SCx	2.8	Pr	.0	PD	C	Lat,V	U

Refer to Table 5 for abbreviations.

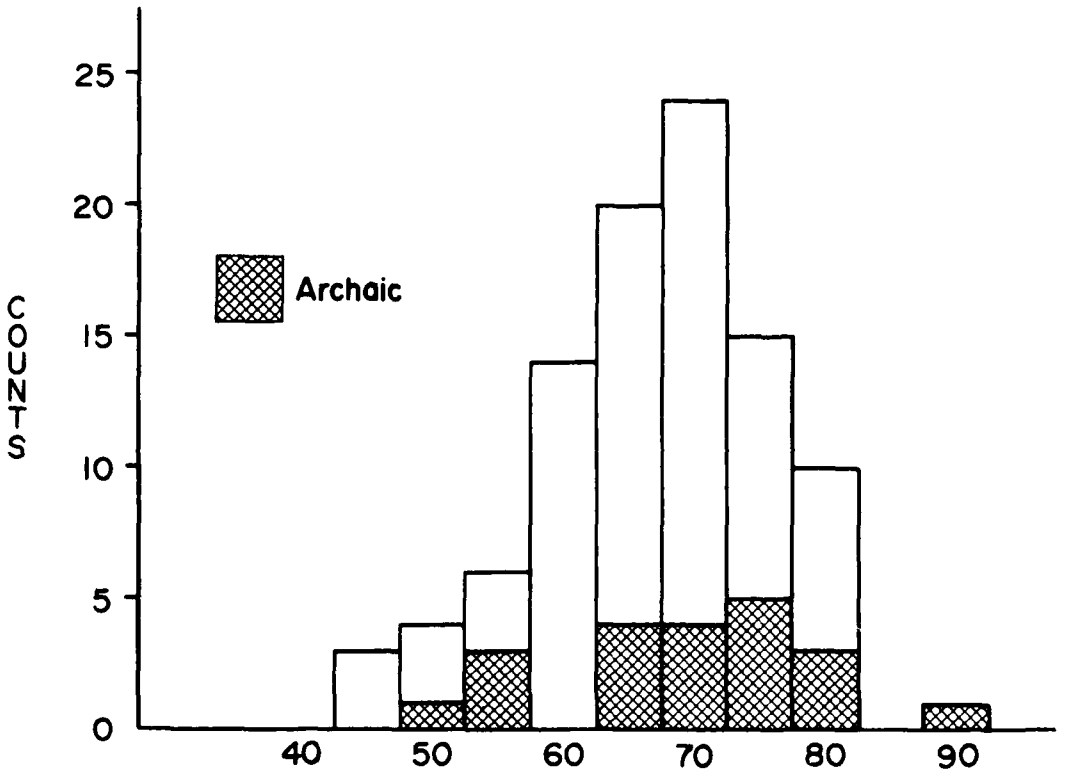

Figure 5. Frequency histogram of bifacial retouch flakes, 23HI241.

Flakes with Polish

Group 61: Flakes with Polish

One interior flake has a light polish (not to be confused with gloss, see Witthoft 1967) on the dorsal surface. The flake has a distal hinge fracture and a shattered striking platform; it appears to have been struck from near the working element of the tool. Length, 11 mm; width, 12 mm; thickness, 3 mm; weight, .3 gm.

Bifacial Retouch Flakes

Group 62: Bifacial Retouch Flakes

There are 101 bifacial retouch flakes; Figure 5 is a frequency histogram of flake angles plotted against provenience. Flake angles cluster between 55 and 80°. Bifacial retouch flakes account for 3.1% of all unmodified flakes.

GROUND STONE

Group 63: Hammerstones (Fig. 14, a)

Two chert river cobbles, two colluvial chert cobbles, and one quartzite pebble exhibit wear in the form of edge crushing and battering. One cobble (5-1) is discoidal in plan view and exhibits edge battering along the medial margin; additionally, one face is lightly polished. The other river cobble is hemispherical in cross section with wear on the curved surface. The two colluvial cobbles are irregularly shaped and exhibit wear on their angular edges. Finally, the quartzite pebble is teardrop-shaped and exhibits wear on the polar ends. Table 13 presents the measurements.

Group 67: Mono-Pitted Stone-Hammerstone-Pigment (Fig. 14, g)

An iron concretion, trapezoidal in plan view, rectangular in transverse cross section and biconvex in longitudinal cross section, exhibits evidence of multifunctional use. The concretion is weathered and has exfoliated in layers. Both faces and lateral edges show evidence of smoothing,

TABLE 13

Hammerstones, 23HI241: Measurements (mm)

Specimen	Maximum Length	Maximum Width	Maximum Thickness	Weight (gm)	
1-5	65	62	45	195.7	
2-2	33	24	14	14.6	Fig. 14, a
5-1	101	84	45	548.5	
7-5	70	51	45	188.7	
10-2	52	57	54	176.3	

with striations parallel to the long axis of the tool. In addition there are a few striations perpendicular to the tool's long axis, suggesting the tool was scraped in an attempt to obtain pigment. The center of one face of the tool has a shallow (about 1 mm deep) irregular depression 8 x 11 mm, with the long axis of the depression parallel to the long axis of the tool. The opposite face of the tool has a large squarish pitted area along one margin, 2 mm deep and about 29 mm on a side (this pit may have been enlarged as a result of weathering). Finally, both polar ends are battered and exhibit a few small irregular flake scars (partially obliterated as a result of exfoliation) suggesting use as a hammerstone. Length, 87 mm; width, 58 mm; thickness, 35 mm; weight, 296.5 gm; color, 2.5YR4/4 (reddish brown) to 7.5YR6/4 (light brown).

Group 69: Pitted Stone-Metate

This group is made up of one fragment of a larger sandstone slab (at least 53 mm thick) which has one face ground flat. Two shallow (about 1 mm) roughly circular pits, both about 10 mm in diameter, are in the ground surface. In addition, two sides of the tool show some smoothing. No measurements are presented.

Group 72: Iron Concretion

Three weathered, irregularly-shaped fragments of an iron concretion may have been used as a source for pigment. The concretion is a dark red (2.5YR3/6). The combined weight of the three fragments is 2.1 gm.

DEBITAGE

Group 73: Unmodified Flakes, Shatter, Broken Rock, and Pebbles-Cobbles

TABLE 14

Distribution of Debitage, 23HI241

	Flakes						Shatter		Pebbles		Broken Rock				
	Primary Decortication		Secondary Decortication		Interior		Cortical	Interior	Chert	Dolomite	Chert Cobbles	Chert	Quartzite	Sandstone	Limestone
	W	B	W	B	W	B									
General Surface	-	1	3	-	9	18	6	8	-	-	-	-	-	-	-
Square 1															
Plow Zone	8	15	17	32	152	1,174	100	531	101	19	-	-	-	227	157
23-33 cm BS	1	5	-	2	26	152	10	91	21	-	-	-	-	78	35
33-53 cm BS	1	9	1	2	41	349	15	153	26	-	1	-	-	171	30
53-73 cm BS	-	-	-	1	7	21	-	8	-	-	-	-	-	2	-
73-93 cm BS	-	-	1	-	-	5	-	-	-	-	-	-	-	-	-
Square 2															
Plow Zone	12	15	13	15	124	674	30	353	40	-	-	-	58	-	34
26-36 cm BS	-	5	3	2	28	142	12	71	-	-	-	1	41	-	33
36-56 cm BS	-	-	1	2	19	71	6	42	9	-	-	-	-	21	7
56-76 cm BS	-	-	-	-	-	8	2	2	-	-	-	-	-	3	2
Totals	22	50	39	56	406	2,614	181	1,252	197	19	1	1	99	502	298

W = Whole

B = Broken

There are 3187 unmodified flakes/flake fragments, of which 72 are primary decortication, 95 are secondary decortication, and 3020 are interior flakes. Decortication flakes make up 5% of the unmodified flakes. There are 1440 pieces of chert shatter, of which 12.6% or 181 retain cortex on at least one surface. A total of 900 pieces of broken rock (all presumed to be heat shattered) are present: 99 are quartzite, 502 are sandstone, 298 are limestone, and one is a piece of heat shattered chert. There are also 197 chert and 19 dolomite pebbles, in addition to one unmodified chert cobble. Data on these classes of material are presented in Table 14.

CERAMICS

Ceramics 1: Grit Tempered Sherds

Five sherds are too weathered to allow determination of surface treatment or decoration. One sherd has medium sized grit temper and a loose paste with weak red (2.5YR4/2) interior and exterior color. Three sherds have a fine grit temper in a porous paste (this may be the result of leaching of the temper) with interior and exterior colors variable. A single sherd with fine grit temper and solid paste has a smoothed interior; colors are: interior, dark reddish brown (5YR3/2); exterior, pink (5YR7/3).

Ceramics 2: Fired Clay

An irregularly-shaped piece of fired clay has large, crushed fragments of chert for temper. The light red (10R6/6) color appears to be a result of mixing the paste with hematite pigment. Some surfaces appear to be worn smooth. Length, 35 mm; width, 23 mm; thickness, 16 mm; weight, 12.7 gm.

Discussion

INTRASITE COMPARISON

The horizontal distribution of material is not especially meaningful due to the small area excavated. The vertical distribution of artifacts is presented in Table 15.

Points in Groups 1B and 4 are generally considered to be arrowpoints, based on their size and weight (Fenenga 1953) and are indicative of relative lateness in time. The Group 1B point, although similar to unnotched triangular forms thought to indicate Mississippian occupations or influence (Chapman 1954; Wood 1961: 67) is larger and thicker than other reported specimens and may best be assigned to a Late Woodland context. Group 4 points are within the range for Scallorn points, which are assigned to Late Woodland components (Chapman 1954: 49) and have a suggested temporal duration of AD 500 to 1200 (Wood and McMillan 1969: 17). The Group 10 points are similar to narrow notched varieties of corner-notched points which are reported in ceramic contexts in the reservoir area (Falk and Lippincott 1974: 45; Chomko 1976: 93). The expanding stem point (Group 13) resembles other forms (variously reported as corner-notched points) found in preceramic contexts dated at approximately 3000 BP at Phillips Spring (Chomko 1976: 108).

The distribution of the point types indicates there is a Late Woodland component in the plow zone and in the upper 40 cm of 23HI241. The Group 13 point indicates a preceramic component underlies the Woodland materials.

The small sample of ceramics (from the upper part of Square 2) can be assigned a Late Woodland context; grit tempering appears in Late Woodland contexts at Blackwell Cave (Falk 1969: 59-61) and at Phillips Spring (Chomko 1976: 104).

TABLE 15

Distribution of Artifacts, 23HI241

Group	General Surface	Square 1, Depth below surface (cm)					Square 2, Depth below surface (cm)				Total
		Plow Zone	23-33	33-53	53-73	73-93	Plow Zone	26-36	36-56	56-76	
1B									1		1
4		6		1			1				8
10	1	1									2
13				1							1
19				1			1				2
20		1	1				2		2		6
22							1				1
28	2										2
30										1	1
33	1						1				2
35	1			1					1		3
36	2										2
37	1										1
43	1						1				2
44	2						1				3
45	1	1					1	1			4
46		1									1
47	2	1						2			5
48	2	1	1	1			3	1	3		12
51									1		1
52	2						1	1			4
54	4	1						1	1		7
56	1	1						1			3
57			1	1							2
58		4					3	1	1		9

TABLE 15: Continued

Distribution of Artifacts, 23HI241

Group	General Surface	Square 1, Depth below surface (cm)					Square 2, Depth below surface (cm)				Total
		Plow Zone	23-33	33-53	53-73	73-93	Plow Zone	26-36	36-56	56-76	
59		8		1	1		4				14
62	4	40	4	13	1		22	6	5	2	101
63	1	1			1		1			1	5
67									1		1
69			1								1
72								1			1
Ceramics			5								5
Fired clay							1				1

The highest percentage of material occurs in the plow zone and in the upper levels of the excavation units and can be assigned to the Woodland component. This suggests that the Archaic component witnessed the less intense utilization of the site (in terms of frequency, duration, and/or size of occupations). Except for arrowpoints, hammerstones, and ceramics, all major classes of tools (represented by more than one specimen) are present in both components.

A number of activities may be inferred from the tool types. Arrowpoints and projectile points are indicative of hunting-butchering; bifaces, and modified flakes and shatter may be interpreted as cutting-scraping tools indicative of hide and wood working; the drill may be associated with either hide or wood working, whereas the flake with polish is most probably related to wood working (see Witthoft 1967); vegetal food processing is indicated by the pitted stone-metate and mono-pitted stone; pigment processing is suggested by the possible use of the Group 67 and 72 specimens; finally, the ceramics indicate containment (Ahler and McMillan 1976).

The changing percentages of tool types between the Woodland and Archaic components suggest changing emphasis on different activities through time (see Table 30). Hunting-butchering and cutting-scraping were important in both components, while vegetal food processing and lithic reduction appear to have been more important in the Archaic. However, the low percentage of decortication (5%) and bifacial retouch flakes (3%) in the lower levels of the site may indicate that reduction of raw material or biface reduction was of minimal importance. It should be noted that the small sample of tools from the Archaic component makes any conclusions highly tentative.

INTERSITE COMPARISON

Point Groups 1B and 4 are considered to be arrowpoints

based on their size and weight (Fenenga 1953). Small triangular points are reported from Stratum 4 at Rodgers Shelter (McMillan 1965: 378), Stratum V at Blackwell Cave (Falk 1969: 79; Wood 1961: 58) and in the upper levels of the Fulton Site (Lippincott 1972: 46-47), Saba Shelter (Vehik 1974: 39) and Beck Shelter (this report). Vehik (1974: 102) suggests that unnotched triangular points, usually associated with shell tempered ceramics, indicate relative lateness in time (ca. AD 800 to 1600). However, the Group 1B specimen is thicker and larger than these other reported forms and may best be assigned a Late Woodland context.

Small corner-notched points (Group 4) fall within the range of Scallorn points (Bell 1958: 84-85). They are a common point form in most components of the Fristoe Burial Complex (Wood 1967: 112-113) and were in ceramic contexts at the Fulton Site (Lippincott 1972: 11), Blackwell Cave (Falk 1969: 79 and Wood 1961: 58), Rodgers Shelter (McMillan 1965: 354 and 1966: 17), the Miller Site and Saba Shelter (Vehik 1974: 24, 99), and Beck Shelter (this report). Chapman (1954: 49) assigns the form to the Late Woodland period, while Wood and McMillan (1969: 17) assess a temporal range for the point type from AD 500 to 1200.

The Group 10 points are similar to narrow notched varieties of corner-notched points found in ceramic contexts at the Thurman Site (Falk and Lippincott 1974: 45, Table 4) and Phillips Spring (Chomko 1976: 93).

The expanding stem point (Group 13) compares very well with the Group 7 points in Strata D and G_f at Phillips Spring which are assigned to a Late Archaic component dated at 3000 BP (Chomko 1976: 34, 108). Similar points, usually grouped with wide notched varieties of corner-notched points, are found in preceramic contexts at the Miller Site (Vehik 1974: 24), Blackwell Cave (Falk 1969: 86), the Fulton Site

(Lippincott 1972: 47-48) and Rodgers Shelter (McMillan 1965 and 1966).

Flakes with polish (Group 61) have been recovered from the Merideath Site in a preceramic context (Falk 1969: 30) and in a ceramic context at Phillips Spring (Chomko 1976: 93).

The remaining chipped and ground stone tools fall in the range of reported forms from other sites in the western Ozarks.

The small sample of poorly preserved ceramics is not readily comparable to ceramics from other sites. Grit tempered sherds do occur at Rodgers Shelter (McMillan 1965: 342), Blackwell Cave (Falk 1969: 59-61; Wood 1961: 56-58), and Phillips Spring (Chomko 1976: 78-80), apparently in Late Woodland contexts.

Summary and Recommendations

Two components are present at 23HI241: a Late Archaic component is in the lower levels and may date as early as 3000 BP; a Late Woodland component occurs in the plow zone and upper levels of the site and may date from AD 500 to 1000. Similar activities were carried out at the site during both components, although there appears to be an increase in lithic activities and site utilization through time.

Although the major occupation of the site has been disturbed by plowing, there is at least 50 cm of undisturbed deposit representing both the Woodland and Archaic components. It is recommended that further investigations be carried out and that an attempt be made to locate more deeply buried material.

23HI246

The site, a small rock shelter, is in an outcrop of Mississippian limestone on the east (right) bank of Bell Branch in Hickory County, Missouri. The legal designation is SE¼SE¼NE¼ Sec. 15, T38N, R22W, Fristoe Quadrangle (U.S.G.S. 15 minute series). Beck Shelter (this report) is less than 40 m to the north; Phillips Spring is 1.5 km to the north along the Pomme de Terre River.

The west facing shelter (Figs. 6 and 11, a) is the smallest and southernmost of three overhangs which occur in an outcrop of limestone on the hillslope east of Bell Branch; Beck Shelter is in the same outcrop. Bell Branch, a north flowing intermittent feeder creek, is 16 m below and 25 m west of the site. The creek empties into the Pomme de Terre River about 170 m north of the shelter. Outcrops of chert occur on the hill above the shelter but little chert is present as inclusions in the limestone overhang. Present vegetation is an oak-hickory forest modified by the presence of post oak and red cedar below the shelter; above the site is typical hillslope vegetation.

The maximum dimensions of the shelter are: 18 m north-south and 3.5 m east-west, but the effective area below the overhang is reduced by the presence of large pieces of fall rock and the thinness of the overhang at the northern and southern extremes. The floor of the shelter slopes from the back wall to the drip line (declination of 50 cm over 3.5 m) and dips from the north to the south. Beyond the drip line, the hill slopes steeply to Bell Branch.

The site was mapped using a line level and tapes and an arbitrary datum was set. Two adjacent 1.5 x 1.5 m squares were dug near the center of the shelter floor and

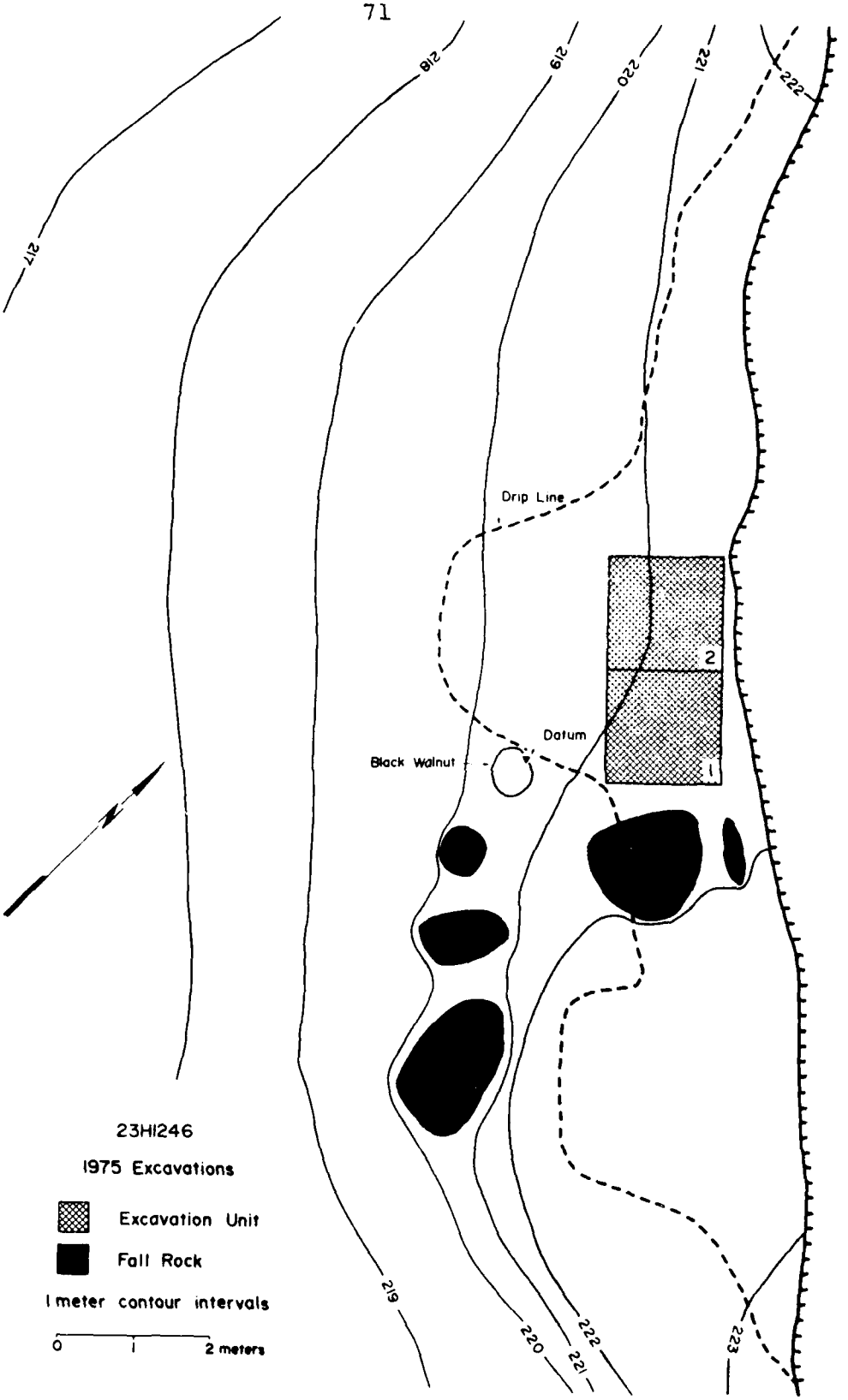

Figure 6. Site 23HI246.

were excavated to bedrock by arbitrary 10 cm levels which followed the surface contours. The single feature was treated as a separate excavation unit within the level in which it occurred. All back fill was passed through a ¼ inch mesh screen.

Stratigraphy

No cultural or natural stratigraphy was noted during excavations; the shelter deposits are wet and as such color changes may have been obscured. Once the deposits were allowed to dry a slight color change was noted but it is not apparent whether this is due to differential drying or a lithological change. The following description of the stratigraphy is taken from the west profile of Square 1.

The upper 10 to 12 cm is a dark grayish brown (10YR4/2) fine granular sandy silt with many pebble sized fall rock inclusions. A diffuse boundary marks the top of the underlying unit, which is a dark yellowish brown (10YR3/4) fine granular sandy silt approximately 13 cm thick, with a large fraction of pebble-cobble sized fall rock. The 4-5 cm above bedrock is sterile, weathered limestone. The total depth of the deposits varies from about 8 cm near the back wall to 30 cm at the west end of the excavations. Cultural material is dispersed throughout the deposits above the weathered limestone.

Since the shelter is wet, the lack of mottling in the matrix suggests the deposits have been constantly saturated rather than having been periodically dry. In addition, seep water has laid down a travertine deposit on the cultural material and fall rock.

Two samples of the general site matrix were collected for waterscreening through a No. 40 U.S. Standard screen.

The samples, 20x20x10 cm, were taken from the south wall of Square 1. The upper sample, 0 to 10 cm below surface, contained a few fragments of freshwater mussel, 3 pieces of unidentifiable bone, 3 pieces of interior shatter, 2 chert pebbles, and 1748.6 gm of fall rock.

The second sample, 10 to 20 cm (bedrock) below surface, contained freshwater mussel shell fragments, 9 flake/flake fragments, 1 piece of unidentifiable bone, and 1430.7 gms of fall rock. Gastropods in the samples are listed in Table 18: plant and seed fragments have been submitted for identification.

Features

One feature was recognized during the excavations. It was exposed in plan view at the base of Square 2, was cross sectioned and profiled, and the fill was saved for water screening through a No. 40 U.S. Standard screen.

FEATURE 1

A small, roughly circular, charred wood stain, about 32 cm in diameter with a maximum thickness of 1 cm, was in the southwestern corner of Square 2. Its fill contained 4 whole interior flakes, 24 interior flake fragments, 9 pieces of interior shatter, 1 piece of unidentifiable freshwater mussel shell, 6 pieces of unidentifiable bone, and 836 gm of fall rock. Gastropods in the fill are listed in Table 18. Plant and seed fragments have been submitted for identification.

Cultural Remains

CHIPPED STONE

Hafted Graver

Group 26: Hafted Graver (Fig. 14, f)

A single complete tool has an exaggeratedly excurvate blade with a graver-like spur on the distal end. The blade is planar-convex in both cross sections and has even chipped lateral edges. Primary chipping is diminutive and flat on the convex face and is present as one massive flake scar on the planar face; secondary chipping is conchoidal, discontinuous, and bifacial-bilateral; tertiary chipping occurs as edge rounding along the blade edges and on the distal end. Haft element juncture is lateral-basal, resulting in pronounced, squared shoulders. The tang has slightly contracting lateral sides and a straight base formed by unifacial, longitudinal secondary retouch. The base, tang edges, and lower blade margins are lightly ground. It appears to be a reworked contracting stem point with a straight base. Measurements are presented in Table 16.

Bifaces

Two biface segments and one biface fragment are divided into three groups. Measurements are presented in Table 16.

Group 27: Small Triangular Biface (Fig. 14, c)

One biface, lacking the distal end, has a triangular blade with serrated straight blade edges and a subconvex base, and biconvex cross sections. The tool was made from a flake with the striking platform oriented in the basal corner (proximal orientation). Primary chipping is absent; secondary chipping is lamellar, bifacial-unilateral continuous and conchoidal, bifacial-unilateral, and continuous. Tertiary chipping occurs as edge rounding and striations are present perpendicular to one blade edge: polish is present on raised areas on the proximal end. The base was formed by the removal of a single primary retouch flake from both faces. The base and lower third of the blade margins

are ground. The distal break is a transverse stress fracture. It is problematical whether the tool was heat treated. The item is classified separately from small triangular points (Groups 1A to 1C) and other small triangular bifaces because of its larger size and more irregular chipping pattern.

Group 29: Large, Thick Triangular Biface (Fig. 14, e)

One biface, lacking the distal tip, has a triangular blade with one straight and one convex, irregularly chipped blade edge and a convex base. Primary chipping is massive, flat, and bifacial; secondary chipping is conchoidal, discontinuous, and unifacial-unilateral; tertiary chipping is absent. Both cross sections are biconvex. The base was formed by primary chipping similar to that on the blade.

Group 48: Unclassifiable Biface Fragments

A single biface edge fragment is included in this category; it exhibits conchoidal secondary chipping; tertiary chipping is absent.

Cores

Group 52: Polyhedral Core Fragments

Five fragments believed to be from polyhedral cores are present. None of the items has any cortex; two fragments were heat treated and one was burned (after breakage). One fragment, 7-2, shows evidence of use as a hammerstone (edge battering) prior to breakage. No measurements are given.

Modified Shatter

Group 60: Utilized Shatter

A single piece of chert interior shatter has one margin which exhibits wear in the form of unifacial use chip scars. The working element is convex in plan view and planar in cross section. Angles A and B are 25 and 50°, respectively. The working element is 30 mm long (declination from the

TABLE 16

Artifacts, 23HI246: Measurements (mm)

Group	Specimen	Total Length	Blade Length	Haft Length	Blade Width	Haft Width	Base Width	Blade Thickness	Haft Thickness	Weight (gm)	Angle A (°)	Angle B (°)	Wear	Remarks
26	8-1	53	34	19	32	22	16	8	6	11.5	30*	60*	Er	Whole, Fig. 14, f
27	5-3	-	na	na	na	na	20	5	na	-	40	60	Er	Transverse stress fracture heat treated, Fig. 14, c
29	9-1	-	na	na	na	na	41	15	na	-	45	na	no	Fig. 14, e
48	5-4	-	na	na	na	na	-	-	na	-	75	na	no	

na Not applicable

* Edge angles given are for the blade edges; Angle A = 25; Angle B = 60 for graver spur.

Er Edge rounding

plane is 9.4 mm); tool length, 30 mm; width, 38 mm; thickness, 7 mm; weight, 6.4 gm.

Bifacial Retouch Flakes

Group 62: Bifacial Retouch Flakes

There are ten bifacial retouch flakes. The edge angle varies from 55 to 95° (with two flakes not measureable). The small sample of bifacial retouch flakes accounts for 9.7% of all flakes. Edge angle measurements are: one each at 55, 60, 65, 85, 90 and 95°; two at 80°; two are not measurable.

DEBITAGE

Group 73: Unmodified Flakes and Shatter

Counts for these two classes of debris are given in Table 17. A total of 93 unmodified flakes/flake fragments are present; 5 are primary decortication flakes, 7 are secondary decortication flakes, and 81 are interior flakes. Decortication flakes account for 12.9% of all unmodified flakes. Of the 68 pieces of chert shatter, 39 or 57.4% retain some cortex. Pebbles, cobbles, and broken rock were not collected.

FAUNAL REMAINS

In addition to the fragments found in the fill of Feature 1, four fragments of freshwater mussel, too shattered to permit identification, were scattered through the site matrix.

Nineteen bone fragments were recovered (6 of these were found in the water screen sample from Feature 1). Three identifiable elements represent two species with a minimum of one individual each.

A right mandible with the second molar in place is identifiable as a fox squirrel (Scurius niger), representing

TABLE 17

Distribution of Debitage, 23HI246

	Flakes						Shatter	
	Primary Decortication		Secondary Decortication		Interior			
	W	B	W	B	W	B	Cortical	Interior
General Surface	-	2	-	-	-	-	26*	-
Square 1								
0-10 cm BS	-	-	2	1	2	10	4	2
10-20 cm BS	-	-	-	-	-	-	2	6
20-30 cm BS	1	-	1	1	4	5	5	7
Square 2								
0-10 cm BS	2	-	1	-	10	30	1	9
10-20 cm BS	-	-	1	-	6	13	1	3
Fea. 1	-	-	-	-	-	1	-	1
20-30 cm BS	-	-	-	-	-	-	-	1
Totals	3	2	5	2	22	59	39	29

* Probably represents colluvial chert

W = Whole

B = Broken

one individual. The bone, from the surface of the shelter, is apparently recent.

Two elements, a right distal humerus and a left third phalanx, are identifiable as deer (Odocoileus sp.) probably white tail deer (O. virginianus). Both elements, representing a minimum of one individual, were in the 10 to 20 cm (below surface) levels of Squares 1 and 2.

In addition, 7 fragments of large mammal bone, 3 fragments of small mammal bone, and 6 indeterminate bone fragments are present.

Gastropods recovered from the waterscreening of the soil samples are listed in Table 18 (identifications were made by Larry D. Grantham).

Discussion

INTRASITE COMPARISON

The discussion of the horizontal and vertical distribution of material is limited by the small sample size, the thin deposit, and small area excavated. The distribution of artifacts is given in Table 19.

The hafted graver is made from a contracting stem point which falls within the range of Langtry points; the point form (found associated with ceramics at sites in the reservoir area) has a suggested temporal duration of AD 1 to AD 1000-1200 (Chomko 1976: 99-100). No other diagnostic artifacts were recovered.

Feature 1, interpreted as a hearth, was in the southwest corner of Square 2, in the first level above bedrock. Charred wood in the feature fill has been saved for possible radiocarbon dating.

The small sample of faunal remains makes any conclusions about subsistence practices impractical. However,

TABLE 18

Gastropods from 23HI246

Species	Feature 1	Soil Sample 0-10 cm	Soil Sample 10-20 cm
Helicodiscus parallelus	1	2	
H. singleyanus	2		1
Retinella indentata	1		4
Strobilops labyrinthica	2	1	2
Mesodon inflectus	1		
Mesodon sp.			1
Gastrocopta armifera		2	1
G. contracta			1
Zonitoides arboreus		1	2
Polygyradae sp.			1
Unidentified aquatic		1	1

the deer and mussel do indicate hunting and shellfish gathering. In addition, the floral remains, once identified, will give data on exploited plant resources.

There are insufficient gastropods for an environmental reconstruction. The following observations are offered as suggestive of possible environmental conditions. Gastrocopta contracta and Zonitoides arboreus are indicative of a variety of environmental conditions (Baker 1939: 79, 97; Leonard 1959: 123, 174). Gastrocopta armifera is wide ranging but may be characteristic of prairie vegetation (Baker 1939: 95). Helicodiscus parallelus, H. singleyanus, Retinella indentata, and Strobilops labyrinthica are all associated with forested environments (Baker 1939; Leonard 1959; Pilsbry 1939-1948). While Mesodon inflectus is a forest species it may also be found on bare limestone cliffs (Leonard 1959: 94). The unidentified aquatic was most likely brought into the shelter along with the mussels. While all species are currently found in Missouri, R. indentata is at the extreme southwestern margin of its range (Pilsbry 1939-1948). The above suggest environmental parameters similar to those that prevail today.

Activities which took place in the shelter and surrounding area were hunting (deer); collecting (mussels and plant remains); fire related activity (Feature 1); the Group 27 biface and Group 60 utilized shatter may be interpreted as cutting-scraping tools associated with butchering, hide or wood working; the graver is generally thought to be a wood working tool; and lithic reduction activity is indicated by the Group 29 and possibly the Group 48 bifaces (interpreted as preforms), the core fragments, and debitage.

The high percentage of decortication to interior flakes (12.9%) suggests that reduction of raw material took place at the shelter. Also, the high percentage of bifacial

TABLE 19

Distribution of Artifacts, 23HI246

Group	Shelter Surface	Square 1, depth below surface (cm)			Square 2, depth below surface (cm)				Total
		0-10	10-20	20-30	0-10	10-20	FEA.1	20-30	
26				1					1
27						1			1
29	1								1
48						1			1
52	2	1	1					1	5
60	1								1
62	1		3	1				5	10

retouch flakes (9.7%) indicates tool sharpening or biface reduction was an important activity. It should be noted that the wet sediments and presence of fall rock in the sifting screen made it difficult to sort out the cultural versus non-cultural material; small flakes were likely to be overlooked. Since interior flakes tend to be smaller, the sample may be biased in favor of the larger, decortication flakes.

INTERSITE COMPARISON

The single diagnostic artifact from the site is the hafted graver made from a contracting stem point with a straight base. The point form (termed "Langtry" by Bell 1958: 38-39) has a long temporal duration and wide spatial distribution in the western Ozarks. Langtry points have been reported associated with ceramics from the Fulton Site (Lippincott 1972: 12-13), Thurman Site (Falk and Lippincott 1974: 49), Miller Site and Saba Shelter (Vehik 1974: 22-24, 104-107), Rodgers Shelter (McMillan 1965: 362, 365 and 1966: 49), Merideath Site and Blackwell Cave (Falk 1969: 33-34, 80), Phillips Spring (Chomko 1976: 32, 90-93), and the Lindley focus of the Highland Aspect (Wood 1961: 104). A temporal span of AD 1 to 1000-1200 is suggested for the point form in the western Ozarks (Chomko 1976: 99-100).

Subsistence practices in the Woodland components of Blackwell Cave, Saba Shelter, and Rodgers Shelter indicate a heavy reliance on deer with mussels as a major supplement (Falk 1969: 83; Vehik 1974: 95; McMillan 1971: 187-189; and Parmalee, McMillan, and King 1976).

Summary and Recommendations

A Woodland component, which dates between AD 1 and AD 1000 (based on the reworked contracting stem point and absence of shell-tempered ceramics) is present at the shelter.

Activities that took place there include: hunting, plant and shellfish gathering, fire related activity, wood working, hide working or butchering, and lithic reduction (both of raw materials and preforms). The small shelter size and sparsity of cultural material indicates it is a temporary campsite utilized by a small group of people (probably on a number of occasions).

It is recommended that the charred wood from Feature 1 be submitted for radiocarbon dating. Should the date suggest an early ceramic component, further excavations would be recommended since that period is poorly known in the area.

BECK SHELTER, 23HI247

Beck Shelter is in an outcrop of Mississippian limestone on the right (east) bank of Bell Branch in Hickory County, Missouri. The legal designation is the NE¼SE¼NE¼ of Sec. 15, T38N, R22W, Fristoe Quadrangle (U.S.G.S. 15 minute series). 23HI246 (this report) is less than 40 m to the south; and Phillips Spring is 1.5 km to the north along the Pomme de Terre River.

Beck Shelter (Figs. 7 and 11, b) is the central overhang in a series of three shelters in a limestone outcrop 15 m above and 30 m east of Bell Branch. The branch is an intermittent north-flowing feeder creek which empties into the Pomme de Terre River 130 m north of the site. Below the shelter the hillslope supports a mixed riverine-hillslope forest (oak, hickory, post oak, and red cedar are dominant); above the shelter is typical hillslope forest. Chert is present on the hill above the overhang but there is little chert in the limestone of the shelter.

The maximum north-south dimension of the shelter is 29 m, and 7 m along the east-west axis, with a maximum floor to ceiling height of 4 m. The floor slopes from the back wall to the drip line (120 cm over 7 m) and upward from the center of the shelter to the north and south. As at 23HI246, the effective area below the overhang is reduced by the presence of large pieces of fall rock and the narrow ledge which forms the north and south ends of the overhang.

The site was mapped using a line level and tapes and an arbitrary datum was established. Six excavation units, of varying dimensions (due to large fall rock which prevented excavation in some areas), were placed to form a transect along the mouth of the shelter and from the opening to the back wall. Excavation was by 10 cm levels which

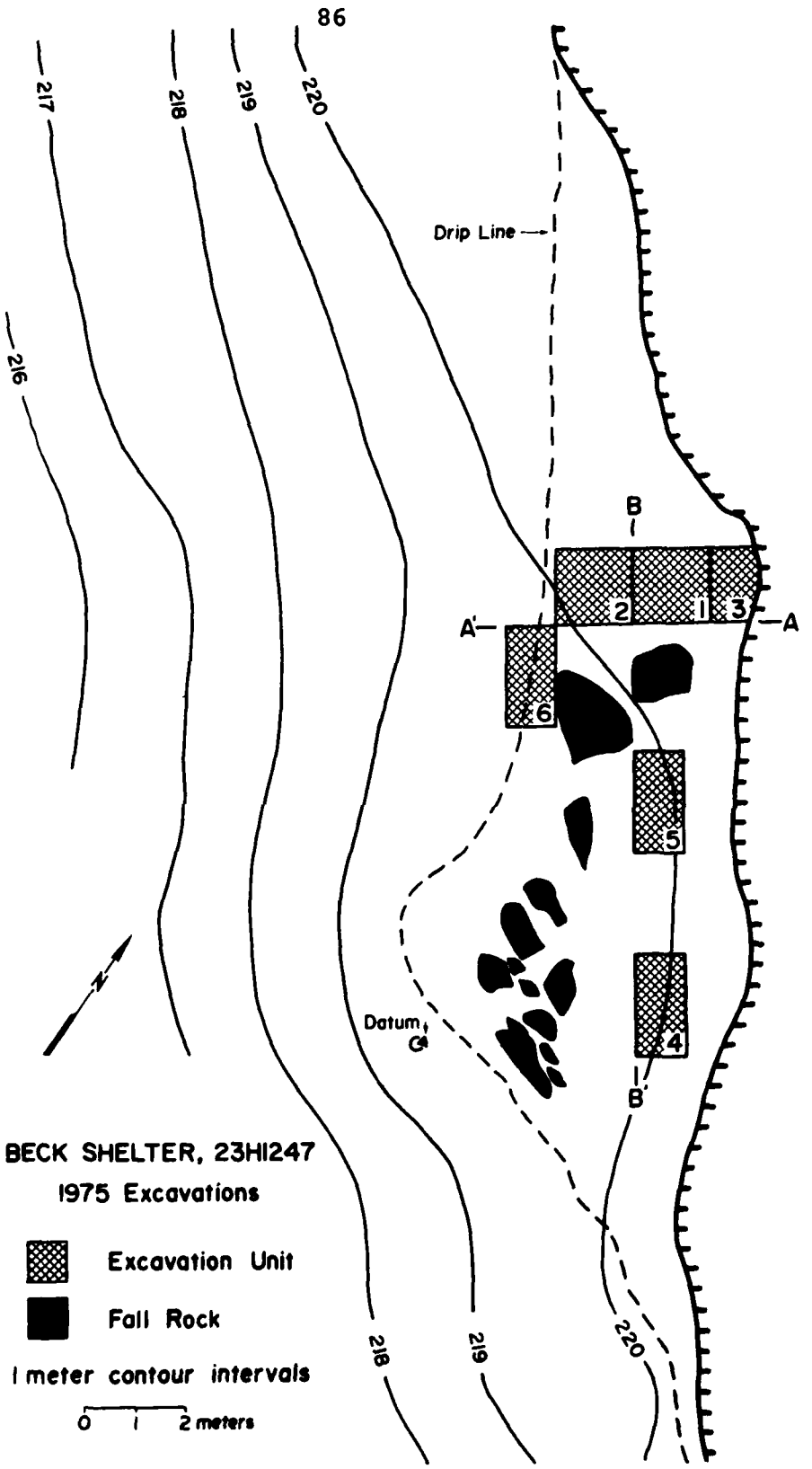

Figure 7. Beck Shelter, 23HI247.

paralleled the surface contours and were labeled by the depth in the southwest corner; in every square the lowest level was not a full 10 cm thick since bedrock sloped more steeply than the surface. Features, treated as separate excavation units, were exposed in plan view, cross sectioned, and half the fill was saved for water screening.

The upper levels in Squares 1 and 2 were passed through a ¼ inch mesh screen; all back fill from the remaining levels was water screened through 1/16 inch mesh in the field. The process involved a pulley system to transport the matrix to Bell Branch where the fill was mixed in buckets with water to disaggregate the clay particles. The mixture was then washed through a screen and the residue was set out to air dry. All the matrix from a single excavation unit (i.e., a level) was then size graded into lots greater than ¼ inch, 1/4 to 1/8, and 1/8 to 1/16 inch particle size; only material greater than ¼ inch is reported here.

Stratigraphy

No obvious natural stratigraphy was recognizable during the excavations, but cultural stratigraphy was present in limited areas represented by features. As at 23HI246 (this report), the deposits are wet but when allowed to dry a color change was noted which related to subtle textural changes in the deposit. However, it cannot be determined whether the observed changes are related to lithology or differential drying. Figure 8 presents two profiles along the major axes of the shelter (for their location refer to Fig. 7). Three major strata and a fourth localized lens were defined.

Stratum A, the upper 2-3 cm of deposit, is a light brownish gray (10YR6/2) to very dark grayish brown (10YR3/2)

unit composed of pebble sized fall rock with little, small-particle size matrix. Cultural material is sparse.

Stratum B is a very dark grayish brown (10YR3/2) to grayish brown (10YR5/2) silty sand with many fine yellowish brown (10YR5/4) mottles and charcoal flecks. Fall rock, pebble to cobble size, occurs throughout the unit and cultural material is abundant.

Stratum C is a dark grayish brown (10YR4/2, 3/2) sandy silt to silty sand with many fine brown (10YR5/3) mottles. Pebble to cobble sized fall rock is abundant and weathered limestone (bedrock) inclusions occur in the lower part of the unit. Cultural material is more abundant near the top of the unit than near bedrock. In Square 6, Stratum C can be subdivided into an upper C_1 and lower C_2; the former is wetter and more compact; the latter approaches a loam in texture with a looser structure, and contains less fall rock.

Stratum D, a localized lens of yellowish brown (10YR5/4) silt with charcoal flecks, occurs in the east profile of Square 1.

Deposits below the overhang revealed a homogeneous stratigraphy which becomes obscured outside the drip line (only two strata are present in Square 6, the surface unit, A, and Stratum C). Bedrock, Mississippian-age limestone, is irregular and weathered; near the back wall of the shelter it is coated with travertine as is most material in the matrix (a result of seep water action). As previously noted, the deposits are wet but do not exhibit characteristics of gleying nor do they appear to have been periodically dry.

Two column samples of the general site matrix were collected in 20x20 cm blocks, 5 cm thick, at continuous intervals from the southeast corner of Square 1 and the

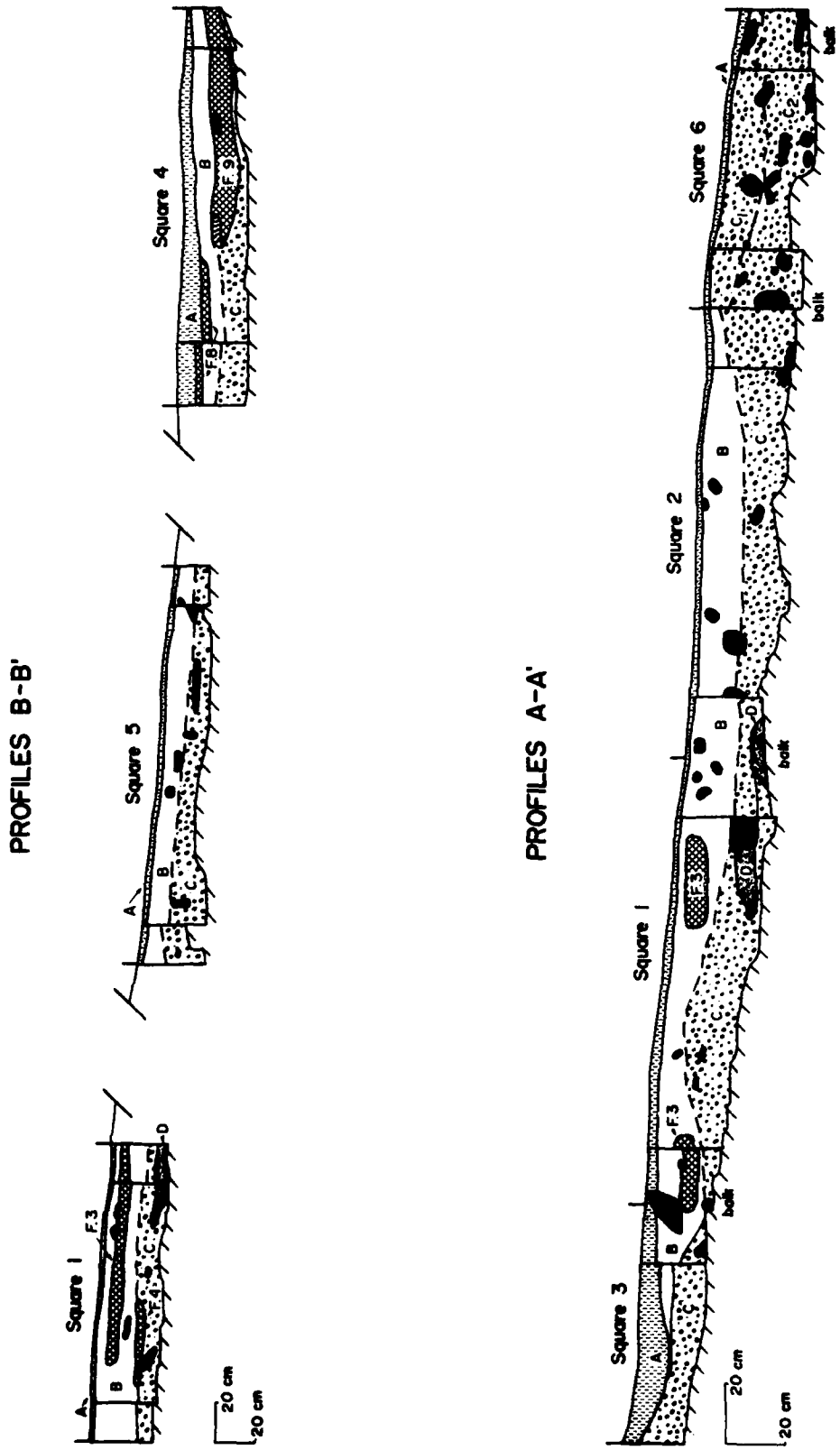

Figure 8. Profiles, 23HI247, Beck Shelter.

northwest corner of Square 6. The samples are being saved for geological analysis.

Features

Seven features were recognized during excavations. All features were exposed in plan view, cross sectioned, and the fill was saved for waterscreening (through a #40 U.S. Standard screen). Cultural material from the features was kept separate from the general level fill in which the features occurred.

FEATURE 3 (Fig. 10, a)

A massive concentration of grayish brown (10YR5/2) to very pale brown (10YR7/4) ash with abundant flecks of charred wood was in Squares 1, 2 and 3, extending into the east and west profile walls. The maximum north-south dimension is 211 cm; the east-west dimension is undefined; maximum thickness varies from 8 to 10 cm across Square 1. The feature was first recognized as two irregular ash concentrations at 81 cm below datum in Square 1 (originally designated Features 1 and 2, and subsequently subsumed under Feature 3). A sample of charred wood was collected from the east part of the feature. Cultural material in the feature fill includes: 1 small triangular point (Variety A), 1 small side-notched point (Variety A), 1 small side-notched point (Variety B), 1 small shallow side-notched point, 2 small corner-notched points, 1 proximal point segment, 1 angular biface segment, 1 biface fragment, 1 core flake, 2 utilized flakes, 24 bifacial retouch flakes, 1 copper object, 1 indeterminate body sherd and 14 fragments of fired clay. In addition, 697 flakes-flake fragments, 201 pieces of chert shatter, 4 chert pebbles, and 4467.3 gm of fall rock were in the feature fill.

Faunal remains include: deer (Odocoileus sp.), and unidentifiable large and small mammal (109 fragments), rodent (2), bird (1), fish (1), turtle (9), indeterminate bone fragments (299), and 67.6 gm of freshwater mussel. Gastropods and floral remains have been submitted for identification.

FEATURE 4

Feature 4 is a well defined semi-circular, shallow, basin-shaped charcoal stain in the south part of Square 1, originating at 106.5 cm below datum. The stain was 51 cm east-west, 22 cm north-south, with a maximum depth of 1.5 cm. A single plain limestone tempered sherd (Ceramics Group 6) was in its fill. There was no other associated cultural material.

FEATURE 5

Feature 5 was a concentration of charred wood in the northeast quadrant of Square 1, originating at a depth of 103 cm below datum. The wood was saved for possible radiocarbon dating.

FEATURE 6

A concentration of charred wood and fire stained sandy silt, resting on bedrock, was designated Feature 6. The feature originated at 112 cm BD; the approximate north-south dimension was 45 cm, and 32 cm east-west; maximum thickness was 6 cm. The concentration of wood was surrounded by a fire-charred matrix (a grayish brown ashy sandy silt) and rested in a natural bowl-shaped depression in the bedrock. Cultural material includes: 51 flake-flake fragments and 12 pieces of chert shatter. Faunal remains include unidentifiable large and small mammal (18 fragments), and indeterminate (18). The floral remains and gastropods have been submitted for identification.

FEATURE 7

An irregularly shaped dark grayish brown stain with charcoal fleck inclusions was in the center of Square 3, originating at 70 cm below datum. The feature is roughly 80 cm north-south by 40 cm east-west, with a maximum thickness of 2.5 cm. Cultural material includes: 1 piece of ground hematite, 34 flakes-flake fragments, and 10 pieces of chert shatter. Faunal remains include unidentifiable large and small mammal (2), indeterminate bone (1), and 3 gm of fresh water mussel.

FEATURE 8 (Fig. 10, b)

Feature 8 was a semi-circular concentration of charred wood fragments and fired matrix which extended into the south and west walls of Square 4. No plan view measurements were possible; maximum thickness at the profile wall was 4 cm. A probable root disturbance cut through the northern part of the feature. A sample of charred wood was saved for radiocarbon dating.

FEATURE 9 (Fig. 10, b)

Feature 9 was a massive, irregularly shaped concentration of charred wood and fire-shattered limestone overlying a thin lens of burned matrix resting on heat-shattered bedrock. The feature originated at about 145 cm below datum encompassing the southeastern third of Square 4, and extending into the southern profile wall (thickness at that point was 9 cm). Material in the feature fill includes: 1 utilized flake, 5 bifacial retouch flakes, 167 flakes-flake fragments, 45 pieces of shatter, 7 chert pebbles and 4173.6 gm of fall rock. Faunal remains ccnsist of deer (Odocoileus sp.), unidentifiable large and small mammal (13), turtle (1), indeterminate bone fragments (7), and 56.6 gm of freshwater mussel shell. Gastropods and floral

remains have been submitted for identification. A sample of charred wood was saved for radiocarbon dating.

Cultural Remains

CHIPPED STONE

Projectile Points

Eighty-three bifacially chipped stone artifacts are classified as projectile points based on weight, general size, and chipping pattern; edge wear is not a criterion of classification (although this is considered under the discussion of the functional tool categories). The points are divided into two major groups—arrowpoints and projectile points—based solely on weight criteria (see Fenenga 1953). There are 7 groups representing arrowpoints and 5 groups of projectile points. Additional categories include: arrowpoint blades; and proximal, medial, and distal point segments. Table 20 gives the measurements for these groups.

Point classification is based on basal morphology and blade form. Descriptive terminology follows Binford (1963); group names follow traditional typologies.

Group 1A: Small Triangular Points, Variety A (Fig. 15, m-o, q-r)

One complete and eight broken artifacts have triangular blades with even chipped, straight to slightly convex blade margins and straight bases. There is no haft element. All points were made from chert flakes; as such, there is no primary chipping. The bulb of percussion, where determinable, is oriented toward the base (proximal orientation). Secondary chipping is lamellar, continuous, and bifacial-bilateral. Tertiary chipping occurs as light edge grounding (8) and bifacial use (1). Secondary retouch on the base is longitudinal continuous, unifacial with a

few conchoidal scars removed from the opposite face; 5 examples have lightly ground bases. Longitudinal cross sections are biconvex to concavo-convex; transverse cross sections are biconvex to plano-convex. One point is complete, two exhibit flat transverse stress fractures, two are hinge fractured, two are impact fractured, one was broken in manufacture (an apparent attempt at basal thinning resulted in the flake hinging out at the distal end), and one has a burin blow to one basal corner. The only item which exhibits use chip scars (35-17) is also the only one which was definitely heat treated. Angle A varies from 20 to 35° (mean 26.4°). Point 14-3 is exceptional in its small size.

Group 1C: Small Triangular Points, Variety C (Fig. 15, p)

One complete item has a triangular blade with even chipped blade margins and a lightly ground convex base. It is concavo-convex in longitudinal cross section and plano-convex in transverse cross section. There is no haft element. The point was made from a flake with the bulb of percussion oriented at the base of the point. Primary chipping is absent; secondary chipping is conchoidal, bifacial-bilateral (but primarily on the dorsal flake aspect), and continuous. Secondary retouch is longitudinal and primarily on the ventral flake aspect. Tertiary chipping occurs as light grinding on the lateral margins.

Group 2A: Small Side Notched Points, Variety A (Fig. 15,s-x)

Two whole and seven distally fractured items are included in this group. Most have triangular to excurvate blades (one has an incurvate blade) with even chipped blade edges; both cross sections vary from biconvex to convex-planar. All points are made from flakes; primary chipping is therefore absent. Secondary chipping is lamellar to expanding, bifacial-bilateral, and continuous. Tertiary

chipping occurs as use flake scars on one item, as edge crushing on two items, and is not apparent on the remaining specimens.

Haft element juncture is lateral-lateral and results in pronounced, angular shoulders. The tang has contracting, even chipped lateral edges (which exhibit edge crushing resulting from manufacture techniques; see Sheets, 1973, for a discussion of edge crushing or abrasion resulting from pressure flaking), and slightly concave to slightly convex basal margins formed by longitudinal, bifacial secondary retouch. Two points were heat treated (two others may have been thermally altered); two exhibit impact fractures, one is longitudinally fractured as a result of a burin blow to the distal end, two exhibit flat transverse stress fractures, and one is missing a basal corner. One specimen (36-2) with a markedly incurvate blade appears to have undergone extensive reworking.

Group 2B: Small Side Notched Points, Variety B (Fig. 15, j-k)

The five specimens in this category are similar to the small side notched, Variety A points, although the blades are small (blade length does not exceed basal width) isosceles triangles. The tang has even chipped straight lateral edges with squared basal corners; the base is straight. Two points (7-1, and 13-3) have a concave depression on one tang lateral edge resembling a diminutive third notch. Three specimens are heat treated, two are impact fractured, one exhibits a flat transverse stress fracture, one is complete, and two items are basal segments. Only one point exhibited wear (in the form of edge crushing).

Group 3: Small Shallow Side Notched Points (Fig. 15, l)

One broken and one reworked item are included in this group. The broken specimen (14-2) has an excurvate blade with even chipped blade margins and planar-convex

cross sections: the reworked point has a triangular blade with even chipped lateral edges and biconvex cross sections. Primary retouch is absent (the points were made from flakes); secondary retouch is expanding to lamellar, bifacial-bilateral, continuous; tertiary chipping occurs as edge crushing on one item. Haft element juncture is lateral-lateral and results in poorly defined side notches with weak, curved shoulders. The tang has even chipped, expanding lateral edges and a slightly concave base formed by longitudinal secondary retouch (bifacial on specimen 14-2; unifacial on 34-16). The broken point is impact fractured.

Group 4: Small Corner Notched Points (Fig. 15, a-i)

Fifteen broken points are included in this category Point form is highly variable. Blades range from small equilateral triangles to elongated isosceles triangles i form, with even chipped to weakly serrated straight to slightly convex blade margins. All points were made from flakes (orientation is indeterminable); thus, primary chipping is absent. Secondary chipping ranges from conchoidal to lamellar, bifacial-bilateral (10) and bifacial-unilateral (4), continuous. Tertiary chipping occurs as bifacial use chip scars (2), unifacial use chip scars (2), edge crushing (4), not apparent (3) and indeterminate (4). Haft element juncture is lateral-basal and results in pronounced angular shoulders and basal corners. The tang has even chipped, straight to slightly concave, expanding lateral edges and convex (2), slightly convex (4), straight (5), slightly concave (2), and indeterminate (2) bases, formed by longitudinal bifacial and unifacial secondary retouch. Primary retouch is sometimes evident on one face. Three points are heat treated, 5 are burned, and 7 are not heat treated. Distal breaks are: one longitudinal burin blow, 3 hinge fractures, 3 heat fractures, 3 impact fractures, 2

irregular fractures, and 1 broken in processing. The points with the small isosceles blades appear to have been reworked from the larger blade form.

An additional 9 items are here classified as tang sections of small corner notched projectile points. Five specimens have straight bases; three are pronouncedly convex; and one is lobate: six are formed by bifacial and 3 by unifacial secondary retouch. All are biconvex in transverse cross section. Six have pronounced lateral extensions of the base which project under the notch while the remaining are more gently curved. Four items were heat treated; two were burned. The base of 32-1 is lightly ground.

Group 5: Contracting Stem Points; Concave Base (Fig. 16, h)

One point base, biconvex in transverse cross section, and broken across the blade just above the shoulders, has even chipped slightly convex tang edges which contract to a pronouncedly concave base. The single shoulder that is present is markedly angular; haft element juncture would be lateral-basal. The missing blade precludes description of chipping. The base was formed by removal of one conchoidal secondary flake scar from both faces; tang edges were formed by lamellar to conchoidal, bifacial secondary retouch. The tang and base were then lightly ground. The item appears to have been impact fractured, with flute-like flake scars extending down both faces of the blade.

Group 6: Large, Shallow Side Notched Points (Fig. 16, f, i-j, m)

Four items are included in this category: three are broken and one is complete except for a basal corner. The blades are triangular to slightly excurvate, with even chipped lateral edges. Longitudinal cross sections are biconvex to planar-convex; transverse cross sections are biconvex. Primary chipping is obscured; secondary chipping

is variable in shape (on a point) but is bifacial-bilateral and continuous. Tertiary chipping occurs as unifacial use chip scars (3) and bifacial use (1); two specimens exhibit edge rounding and two show edge crushing. All blades appear to have been reworked to their present form from wider (triangular ?) blades. Haft element juncture is lateral-lateral, with weakly developed shoulders but pronounced angular basal corners. Notches are shallow, being little more than depressions in the line of the blade edge. The tang is expanding with even chipped slightly concave lateral margins and a slightly excurvate base oriented obliquely to the long axis of the point. Basal primary and secondary retouch is bifacial and longitudinal. All bases exhibit some edge crushing which continues up the sides of the tang. One point may have been heat treated; two show hinge fractures, one a longitudinal burin blow, and one is reworked. The latter (13-8) has the distal 1/3 of one blade margin reworked to an acute angle to the long axis of the tool (viewed in plan view); wear on the reworked margin resembles edge rounding on drill shafts; length of the working element, 19 mm; thickness, 4 mm; edge Angle A, 25°; Angle B, 60°.

Group 9: Large Corner Notched Points, Straight Base (Fig. 16, k)

One distally fractured point has a triangular blade with straight, even chipped edges and biconvex cross sections. Primary chipping is diminutive, flat, expanding to lamellar, bifacial; secondary chipping is conchoidal to expanding, alternating faces unilateral, discontinuous. Tertiary chipping occurs as unifacial use chip scars and edge rounding. Haft element juncture is lateral-basal (verging on lateral-lateral) and results in pronounced curved shoulders and basal corners; notches are relatively

deep. The tang has even chipped and lightly ground expanding lateral edges and a straight base oriented obliquely to the long axis of the tool. Basal retouch is the removal of a single primary retouch flake from one face, with secondary longitudinal retouch on the opposite face; the base was then heavily ground. The blade exhibits a transverse stress fracture and appears to have been reworked (from a wider blade form) prior to breakage.

Group 11: Large Corner Notched Point, Convex Base (Fig. 16, d)

The single item in this category is the haft element of a large expanding tanged point. Since the item is fractured across the shoulders, blade form and chipping are not known. The haft element juncture is lateral-basal, with angular shoulders and basal corners. The tang has slightly concave, expanding lateral edges formed by bifacial secondary retouch; the base is pronouncedly convex, formed by longitudinal bifacial primary retouch and heavy grinding. The point is heat fractured, exhibiting "pot lid" scars.

Group 15: Large Triangular Point, Concave Base (Fig. 16, g)

One item, made from fossiliferous chert, has even chipped blade edges. The blade appears to have been triangular, with a biconvex transverse cross section and an indeterminate longitudinal cross section. Primary chipping is diminutive, flat, expanding to conchoidal, and bifacial; secondary chipping is sporadic on both faces and tends to be conchoidal. Tertiary chipping occurs as edge crushing on one lateral edge. There is no haft element, but there is a suggestion of side notches on the lower blade edges. The base is pronouncedly concave, formed by unifacial primary retouch with a few longitudinal secondary retouch scars on the opposite face. The blade shows a flat transverse stress fracture. One face retains a green (copper sulfate ?) stain.

Group 16: Proximal Point Segments

Two tang sections of projectile points have lightly ground contracting lateral edges and straight bases (also ground). Basal retouch is in the form of a few longitudinal retouch scars on one face of the tang and one lateral secondary retouch scar on the opposite face. Haft element juncture is indeterminate.

Group 17: Medial Projectile Point Segments

Six items are believed to be medial projectile point fragments, based on size and chipping patterns. Four (15-21, 31-2, 35-1, and 35-15) have even chipped straight to convex blade edges, biconvex cross sections, and exhibit conchoidal, bifacial-bilateral, continuous secondary chipping. Tertiary chipping occurs as edge rounding (2), edge crushing (1), and indeterminate (1). The two remaining items exhibit lamellar, bifacial-bilateral, continuous secondary retouch, forming even chipped straight blade margins and biconvex transverse cross sections. Both exhibit bifacial use chip scars on their lateral edges. The proximal break is a hinge fracture (4), or flat transverse stress fracture (2); two have distal impact fractures, 3 have distal hinge fractures, and one is indeterminate.

Group 18: Unclassifiable Arrowpoint Blades

Five items are here classified as blade section of projectile points; size and weight estimates of the complete points suggest they are arrowpoints. Two items (30-3 and 35-16) have long, narrow triangular blades with slightly serrated blade margins; they are biconvex in both cross sections. The points were probably fashioned from flake-blades or blades; thus, primary chipping is absent. Secondary chipping is lamellar, bifacial-bilateral, continuous and finely worked. Tertiary chipping is absent. The points were broken across the shoulders; haft element is

indeterminate. One item (30-3) exhibits a possible impact fracture; 35-16 is heat shattered (pot lid scars). These blades have no counterparts in the described projectile point types.

Three blades are triangular, with one serrated and one even chipped, straight blade margin. All were made from flakes (13-23 has both original flake surfaces visible). Secondary chipping is conchoidal, bifacial-bilateral, and continuous; tertiary chipping occurs as light edge grinding on the raised portions of the serrated blade margin. A large, thick projection occurs on 13-23 on one blade margin; apparently it was not possible to trim it further. Since the points are broken across the shoulders, haft element form and juncture is indeterminate. However, the blades are similar to those on the small corner notched points.

Group 19: Distal Point Segments

Twelve biface fragments are classified as distal point segments, based on size and chipping pattern. All are too fragmentary to determine blade shape. Five specimens exhibit conchoidal, continuous, bifacial-bilateral secondary retouch and even chipped blade margins, biconvex in cross section. Tertiary chipping occurs as bifacial use chip scars or edge crushing; proximal fractures are flat transverse or shallow hinge fractures. Five items exhibit lamellar, continuous, bifacial-bilateral secondary retouch, forming even to slightly serrated blade margins and biconvex blades; wear occurs as use chip scars and edge rounding; proximal fractures are all flat transverse stress fractures. The remaining two items exhibit conchoidal retouch on three edge faces only, and much of the original flake surface is visible; wear occurs as edge rounding; breaks are flat transverse.

TABLE 20

Projectile Points, 23HI247: Measurements (mm)

Group	Specimen	Total Length	Blade Length	Haft Length	Shoulder Width	Haft Width	Base Width	Blade Thickness	Haft Thickness	Weight (gm)	Angle A (°)	Angle B (°)	Wear[1]	Figure	Remarks
1A	3-1	28	na	na	na	na	13	4	na	1.2	25	na	Gd	15,m	Ground lateral edges and base
	4-3	-	na	na	na	na	15	3	na	-	30	na	-	15,g	Ground lateral edges and base
	8-1	-	na	na	na	na	15	-	na	-	-	na	-		
	8-2	-	na	na	na	na	14	-	na	-	-	na	-		Impact fractured ground base
	13-6	-	na	na	na	na	17	3	na	-	20	na	Gd	15,r	Ground lateral edges
	14-3	13	na	na	na	na	-	2	na	-	25	na	Gd	15,n	Ground lateral edges
	15-7	-	na	na	na	na	13	2	na	-	25	na	-		
	22-2	-	na	na	na	na	13	2	na	-	35	na	Gd	15,o	Ground lateral edges and base
	35-17	-	na	na	na	na	-	3	na	-	25	55	U		Ground base; heat treated
1C	13-5	23	na	na	na	na	14	3	na	1.0	30	na	Gd	15,p	Ground lateral edges and base
2A	11-5	19	14	5	8	7	-	3	3	.6*	50	na	-	15,u	
	13-4	-	-	8	9	6	11	3	3	.9*	45	na	-		Transverse stress fracture
	14-4	-	-	6	12	6	11	2	2	-	-	-	-		Transverse stress fracture
	15-10	26	18	8	10	7	11	4	4	1.2	50	na	-	15,t	
	24-4	15	10	5	7	6	8	2	2	.2	45	na	-	15,r	Heat treated
	30-1	-	-	7	8	4	9	2	2	-	40	na	-		Heat treated; impact fractured
	35-7	-	-	6	10	8	12	3	3	-	30	45	U	15,w	Heat treated impact fractured
	36-2	34	26	8	15	8	-	5	4	2.0*	80	80	Ec	15,s	
	36-3	-	-	7	-	7	12	3	3	-	35	na	Ec	15,x	Longitudinal burin blow
2B	7-1	-	-	8	-	8	12	-	2	-	-	-	-		Impact fractured
	13-3	-	-	9	9	6	12	3	3	.6*	55	na	-	15,j	Heat treated impact fractured
	14-1	-	-	9	-	-	-	2	2	-	30	na	-		Heat treated
	35-21	-	-	-	-	-	13	-	-	-	-	-	-		Transverse stress fracture
	36-1	17	9	8	10	7	13	3	3	-	60	60	Ec	15,k	Heat treated
3	14-2	-	-	7	10	9	11	3	3	-	70	na	Ec	15,l	Impact fractured
	34-16	15	7	8	11	9	11	3	3	.6	65	na	-		
4	3-4	-	-	7	-	-	-	4	-	-	35	na	-		Longitudinal burin blow
	3-5	-	-	6	10	5	7	2	2	.7*	20	na	-		Hinge fracture

TABLE 20: Continued

Projectile Points, 23HI247: Measurements (mm)

Group	Specimen	Total Length	Blade Length	Haft Length	Shoulder Width	Haft Width	Base Width	Blade Thickness	Haft Thickness	Weight (gm)	Angle A (°)	Angle B(°)	Wear[i]	Figure	Remarks
	5	-	-	7	13	5	9	3	3	-	30	55	U	15,i	Heat fractured
	6-3	17	9	8	10	-	-	4	4	.6*	50	-	Ec		Reworked blade margins
	15-2	-	-	5	11	-	-	5	4	-	50	65	U	15,f	Impact fractured
	16-4	-	-	-	-	6	10	-	2	-	-	-	-		
	22-1	-	-	5	14	-	-	4	3	-	25	60	U,Ec	15,e	Hinge fracture
	24-3	16	11	5	9	-	-	3	2	.6*	65	65	Ec	15,b	
	31-1	-	-	6	13	6	10	3	2	-	40	45	U	15,g	Heat fractured
	32-1	-	-	-	-	7	12	-	3	-	-	-	-		Ground base
	33-1	-	-	7	8	7	9	3	3	-	-	-	-	15,a	Impact fractured
	34-15	-	-	7	11	6	9	3	3	.7*	50	na	-	15,c	Heat treated
	34-17	-	-	6	-	5	11	-	3	-	-	-	-	H	Heat treated
	35-8	-	-	7	8	7	7	4	4	-	60	-	Ec	15,h	Hinge fracture
	35-9	-	-	6	12	6	8	2	2	-	-	-	-	15,d	Heat treated
	35-10	-	-	6	-	4	9	3	3	-	30	na	-		Impact fractured
	35-22	-	-	-	-	5	8	-	3	-	-	-	-		Heat treated
	35-23	-	-	-	-	5	8	-	3	-	-	-	-		Heat treated
	35-24	-	-	-	-	5	10	-	2	-	-	-	-		Heat treated
	35-25	-	-	-	-	6	10	-	2	-	-	-	-		
	36-5	-	-	-	-	5	11	-	3	-	-	-	-		Heat fractured(?)
	36-6	-	-	-	-	5	-	-	2	-	-	-	-		Heat fractured(?)
	36-7	-	-	5	9	5	6	-	2	-	-	-	--		Heat fractured
	36-34	-	-	-	-	6	10	-	2	-	-	-	-		
5	15-1	-	-	21	-	22	8	-	8	-	-	-	-	16,h	Impact fractured
6	13-7	-	-	10	24	17	18	9	6	-	30	70	U	16,f	Hinge fracture
	13-8	52*	37*	15	-	23	27	6	6	-	25	60	U,Er	16,j	Longitudinal burin blow reworked
	15-3	-	-	12	26	25	28	9	9	-	40	60	U	16,i	Hinge fracture
	15-9	50	36	14	28	30	-	7	7	8.3	40	55	U,Er	16,m	
9	2-1	-	-	15	32	22	28	7	6	-	40	55	U,Er	16,k	
11	3-7	-	-	12	-	14	18	-	5	-	-	-	-	16,d	Heat fractured
15	24-1	-	-	na	na	na	32	9	na	-	-	-	Ec	16,g	Transverse stress fractured
16	6-8	-	-	-	-	-	10	-	-	-	-	-	-		
17	15-21	-	-	-	-	-	-	-	3	-	40	55	U,Er		Hinge fracture
	24-6	-	-	-	-	-	-	-	-	-	35	50	-		Transverse stress fracture
	31-2	-	-	-	-	-	-	-	-	-	40	60	U,Er		Impact fracture
	34-7	-	-	-	-	-	-	-	-	-	25	50	-		Transverse stress fracture
	35-1	-	-	-	-	-	-	-	-	-	40	60	U		Impact fracture
	35-15	-	-	-	-	-	-	-	-	-	40	55	Ec		Shattered distally

TABLE 20: Continued

Projectile Points, 23H1247: Measurements (mm)

Group	Specimen	Total Length	Blade Length	Haft Length	Shoulder Width	Haft Width	Base Width	Blade Thickness	Haft Thickness	Weight (gm)	Angle A (°)	Angle B (°)	Wear[i]	Figure	Remarks
	15-30	-	-	-	-	-	11	-	-	-	-	-	-		
18	13-23	-	15	-	11	6*	-	3	-	-	-	60	-		
	13-32	-	-	-	-	-	-	-	-	-	20	na	-		
	15-29	-	-	-	-	-	-	-	3	-	25	50	U		Transverse stress fracture
	30-3	-	-	-	15	8*	-	-	3	-	35	na	-		Hinge fracture
	35-16	-	-	-	-	-	-	-	3	-	35	na	-		Heat shattered
19	3-3	-	-	--	-	-	-	-	-	-	40	60	U		
	3-9	-	-	-	-	-	-	-	-	-	20	40	-		
	8-3	-	-	-	-	-	-	-	-	-	30	50	U,Er		Heat treated
	8-4	-	-	-	-	-	-	-	-	-	-	50	Er		
	11-6	-	-	-	-	-	-	-	-	-	50	70	U,Er		Heat treated
	13-9	-	-	-	-	-	-	-	-	-	-	55	Ec		
	15-18	-	-	-	-	-	-	-	-	-	40	40	-		
	30-2	-	-	-	-	-	-	-	-	-	20	60	U,Er		Heat treated
	34-6	-	-	-	-	-	-	-	-	-	35	35	-		Heat treated
	35-19	-	-	-	-	-	-	-	-	-	35	40	U,Er		Heat fractured
	36-8	-	-	-	-	-	-	-	-	-	35	60	Ec		Heat treated
	36-9	-	-	-	-	-	-	-	-	-	45	60	U,Er		

* Estimated complete measurement
na Not applicable
i Ec = Edge crushing
Er = Edge rounding
Gd = Ground
U = Unifacial use chip scars

Drills

Group 23: Expanding Base Drill (Fig. 16, e)

The one item in this category is made from a gray fossiliferous chert flake. It is concavo-convex in longitudinal cross section, the transverse cross section (of the shaft) is triangulo-planar. The base is formed by the unworked remnant of a flake with a proximal hinge fracture (a result of attempting to thin the shaft near its junction with the base). The shaft was formed by fine, continuous, conchoidal, bifacial-bilateral secondary retouch. Wear occurs as bifacial use chip scars and edge rounding, with some polish evident on the dorsal aspect of the shaft. Length, 35 mm; width, 17 mm; thickness, 4 mm; length of shaft, 21 mm; width of shaft, 6 mm; thickness of shaft, 3 mm; weight, 1.4 gm; Angle B, 70°.

Group 24: Lobate Base Drill (Fig. 16, c)

One item, made from a heat treated chert flake, appears to be the proximal portion of a lobate base drill. The bulb of percussion is present at the proximal end of the tool. The sides of the base were formed by continuous, bilateral, lamellar secondary retouch on the ventral aspect: the right dorsal margin exhibits conchoidal retouch; the left dorsal margin is unmodified. The base was formed by unifacial, longitudinal secondary retouch on the ventral flake aspect. The proximal part of the shaft is biconvex in cross section and was formed by bifacial-bilateral, conchoidal, continuous secondary chipping. Tertiary chipping occurs as edge rounding on the shaft. Width, 13 mm; thickness, 5 mm; Angle A, 40°; Angle B, 65°.

Bifaces

Seven relatively complete bifaces have been separated into four groups based on blade outline. In addition, 37

biface segments are classified into 9 groups, based primarily on blade morphology. The groups are subdivided by the qualitative characteristics of small or large (referring to overall size) and thick or thin (general degree of compression of the transverse cross section). Table 21 gives dimensions.

Group 27: Small Triangular Bifaces (Fig. 16, a-b)

Three relatively complete bifaces have small triangular blades with even chipped edges. Longitudinal cross sections vary from plano-convex to biconvex; transverse cross sections are biconvex. All items appear to be made from flakes although the orientation has been obscured. Secondary chipping is conchoidal, bifacial-bilateral, and continuous, and extends across the entire tool surfaces. Tertiary chipping occurs as edge crushing (a probable result of manufacture) on specimen 8-5 only. The base is straight, formed by the bifacial removal of a few secondary retouch scars. They are distinguished from small triangular projectile points by their greater width, larger flake scars, and less regular appearance.

Group 31: Small, Thin, Ovate Biface (Fig. 17, c)

One complete biface has an ovate blade with even chipped blade edges and plano-convex cross sections. Cortex covers most of one surface. Primary chipping is obscured; secondary chipping is conchoidal, continuous, and unifacial (discontinuous on the surface with cortex). Tertiary chipping occurs as heavy edge rounding.

Group 32: Large, Thick, Ovate Biface (Fig. 16, l)

One complete biface has a large, thick, ovate blade with irregularly chipped edges and biconvex cross sections. Primary chipping is massive, deep, with step fractures common, and bifacial; secondary chipping is absent. Wear occurs as manufacturing-related edge crushing. The size, and chipping pattern suggest the item is a preform.

Group 34: Irregular Bifaces

Two bifaces have irregular blade outlines. Specimen 13-15, possibly a bifacially worked core flake, has massive deep to flat primary chipping scars; secondary chipping is absent. Wear occurs as use chip scars on one lateral edge. The longitudinal cross section is biplanar; the transverse cross section is biconvex. The striking platform is present and unfaceted. The second item is a burned biface with an irregular blade and irregular chipped blade margins. Primary chipping is variable; secondary and tertiary chipping is absent. Cross sections are roughly biconvex.

Group 35: Proximal Biface Segment; Large, Thin, Triangular

Two biface segments have even chipped edges which converge at roughly a right angle. Primary chipping is massive, flat, and bifacial; secondary chipping is conchoidal, bifacial, and continuous; tertiary chipping is present on 2-4 as unifacial use and grinding. Specimen 2-4 is heat treated; 6-2 is burned and heat fractured. Item 2-4 shows a hinge fracture.

Group 38: Proximal Biface Segment; Large, Thick, Ovate

Four broken items have slightly convex bases and are believed to be fragments of large, thick, ovate blades with irregularly chipped blade margins. Primary chipping is massive, deep, and bifacial; secondary chipping is conchoidal, unifacial, and discontinuous on two items and is absent on the rest. Tertiary chipping occurs as manufacture-related edge crushing. Cross sections are roughly biconvex. All breaks are irregular. The chipping patterns and irregular breaks suggest broken preforms.

Group 39: Proximal Biface Segment; Concave Base

Two broken bifaces, blade form indeterminate, have concave basal elements. The proximal sides are slightly expanding (4-1) to slightly contracting (13-11), formed

by lamellar to contracting bifacial secondary chipping. The concave bases were formed by longitudinal primary retouch to both tool faces. Longitudinal cross sections are indeterminate; transverse cross sections are biconvex. One item, 4-1, appears heat treated. Both exhibit flat transverse stress fractures. Wear is indeterminate.

Group 40: Proximal Biface Segment; Convex Base

Two broken bifaces are included in this category. Blade form appears to have been ovate with even chipped blade edges and biconvex cross sections. Primary chipping is indeterminate. Secondary chipping is expanding, bifacial-bilateral, and continuous. Tertiary chipping occurs as unifacial use chip scars and some edge rounding. The convex base was formed by longitudinal primary retouch and light grinding. Specimen 34-8 is heat fractured and burned; 36-11 exhibits a transverse stress fracture. The latter appears to have been heat treated.

Group 41: Distal Biface Segments; Small, Thin, Narrow

Two biface fragments, biconvex in both cross sections, are included in this group. They have slightly convex, even chipped blade edges which converge to form a blunt distal tip. Primary chipping is absent; secondary chipping is lamellar to conchoidal, bifacial-bilateral, and continuous. Tertiary chipping occurs as unifacial use chip scars (15-23) or as heavy edge rounding (49-1). One exhibits a flat transverse stress fracture; the other has a shallow hinge fracture and is burned.

Group 42: Distal Biface Segments: Small, Thin, Wide

One biface segment has convex, even chipped blade edges which converge to form a wide blunt point (angle of juncture approximately 31°). The longitudinal cross section is indeterminate; the transverse cross section is biconvex. Primary chipping is indeterminate; secondary

TABLE 21

Bifaces, 23HI247: Measurements (mm)

Group	Specimen	Maximum Length	Maximum Width	Maximum Thickness	Basal Width	Angle A (°)	Angle B (°)	Weight (gm)	Wear[i]	Remarks
27	8-5	17	13	4	-	45	70	.9	Ec	
	15-20	16	18	4	18	35	60	1.1	Obscured	Fig. 16, b
	24-2	19	13	4	12	55	55	1.1	None	Fig. 16, a
31	13-19	43	32	9	na	55	75	13.6	Er	Fig. 17, e
32	2-5	80	56	40	na	65-70	na	135.8	Ec	Fig. 16, l
34	13-15	43	51	16	na	40	80	40.2	U	
	15-24	43	35	19	na	-	-	23.4	None	Heat shattered
35	2-4	-	-	-	-	-	-	-	U	Heat treated
	6-2	-	-	-	-	-	-	-	-	Heat fractured
38	1-2	-	-	-	-	40	70	-	None	
	1-3	-	-	-	-	45	70	-	None	
	34-2	-	-	-	-	75	75	-	None	
	36-14	-	-	-	-	70	70	-	None	
39	4-1	-	-	-	26	na	na	-	None	Heat treated
	13-11	-	-	-	23	na	na	-	None	
40	34-8	-	-	4	19	25	40	-	U, Er	Heat fractured
	36-11	-	-	-	-	45	60	-	U	Heat treated

TABLE 21: Continued

Bifaces, 23HI247: Measurements (mm)

Group	Specimen	Maximum Length	Maximum Width	Maximum Thickness	Basal Width	Angle A (°)	Angle B (°)	Weight (gm)	Wear[i]	Remarks
41	15-23	-	-	-	-	60	60	-	U	
	49-1	-	-	-	-	60	70	-	Er	Heat fractured
42	34-1	-	-	4	-	20	45	-	U,Er	
44	34-5	-	-	-	-	45	60	-	U	
	35-14	-	-	-	-	50	60	-	U	Heat fractured
	35-18	-	-	-	-	40	90	-	-	
45	2-2	-	-	-	-	40	60	-	BU,Ec	Heat fractured
	2-3	-	-	-	-	45	55	-	BU,Ec	Heat treated
	13-12	-	-	-	-	45	60	-	BU,Ec	Heat treated
48	6-7	-	-	-	-	30	55	-	Er	
	7-2	-	-	-	-	35	45	-	-	
	11-8	-	-	-	-	55	65	-	Er	
	13-13	-	-	-	-	45	60	-	U	
	13-14-34-4	-	-	-	-	-	55	-	-	
	13-31	-	-	-	-	50	80	-	U,Er	

TABLE 21: Continued

Bifaces, 23HI247: Measurements (mm)

Group	Specimen	Maximum Length	Maximum Width	Maximum Thickness	Basal Width	Angle A (°)	Angle B (°)	Weight (gm)	Wear[i]	Remarks
	13-34	-	-	-	-	45	65	-	U	
	15-22	-	-	-	-	35	55	-	-	
	15-28	-	-	-	-	20	40	-	U	
	24-8	-	-	-	-	-	-	-	-	
	31-3	-	-	-	-	20	40	-	-	
	31-4	-	-	-	-	20	55	-	Ec	
	34-3	-	-	-	-	20	50	-	U	
	34-26	-	-	-	-	60	60	-	-	
	35-20	-	-	-	-	-	-	-	U	
	36-10	-	-	-	-	20	50	-	Er	
	36-13	-	-	-	-	55	65	-	-	

[i] na Not applicable
BU Bifacial use chip scars
Ec Edge crushing
Er Edge rounding
U Unifacial use chip scars

chipping is expanding to lamellar, bifacial-bilateral, and continuous. Wear occurs as bifacial use chip scars and edge rounding. The tool has a shallow hinge fracture.

Group 44: Distal Biface Segment: Large, Thick

Three biface segments have even chipped, convex blade margins which converge to form a blunt distal end. Both cross sections appear to have been biconvex. Primary chipping is massive, flat, and bifacial; secondary chipping is conchoidal, discontinuous, and bifacial-bilateral with step fractures. Tertiary chipping occurs as use chip scars on two items. Break form is variable: one is heat fractured, one has a flat transverse fracture, and one has an angled stress fracture.

Group 45: Medial Biface Segments

Three biface segments are believed to be medial segments of triangular to ovate bifaces with even chipped blade edges and biconvex cross sections. Primary chipping is massive, flat, and bifacial (2-2) or obscured (2-3 and 13-12); secondary chipping is lamellar to angular expanding, bifacial-bilateral, and continuous; tertiary chipping occurs as bifacial use chip scars. Item 2-2 is burned; the rest appear to have been heat treated. Breaks are variable.

Group 45: Unclassifiable Biface Fragments

Eighteen biface fragments are present. All are too fragmentary to classify to any of the above groups. Wear varies from absent to use chip scars and edge rounding. One item (13-14), which fits 34-4, has a pronounced shoulder which is ground.

Bifacially Worked Flakes

Group 49: Bifacially Worked Flakes

Two interior flakes (3-10 has a fracture plan on the dorsal surface) have triangular outlines. One lateral

TABLE 22

Bifacially Worked Flakes, 23HI247: Measurements (mm)

Specimen	Length	Width	Thickness	Weight (gm)	Angle A (°)	Angle B (°)	Wear	Remarks
3-10	21	15	3	1.0	65	-	Ec	Step fractures
15-19	32	21	5	2.9	85	-	-	Step fractures

margin exhibits bifacial secondary retouch in the form of small conchoidal to expanding continuous flake scars. A few unifacial secondary chipping scars occur on the opposite lateral margin near the distal end, and form the point. Tertiary chipping occurs as edge crushing. Both exhibit burin blows to the proximal end, transverse to the long axis of the tool. Longitudinal cross sections are concavo-convex and roughly biconvex in transverse section. Item 3-10 was heat treated. Both tools may represent small triangular projectile points in a stage of manufacture.

Bifacially Worked Pebble

Group 50: Bifacially Worked Pebble

The single item in this group is a fragment of a presumably ovate pebble with thin biconvex cross sections. The pebble exhibits a few massive, deep, bifacial primary retouch scars (cortex is present along one lateral edge). Step fractures are common and one edge exhibits a burin blow. Width, 30 mm; thickness, 9 mm; weight, 14.1 gm.

Cores

Group 52: Polyhedral Core Fragments

Seven chert fragments, believed to be portions of cores, exhibit irregularly oriented flake scars over their surface. Five retain some cortex on one face. No measurements are presented.

Group 53: Prismatic Core Fragments

Two core fragments exhibit a series of regularly spaced blade scars, leaving "U" shaped bits in the striking platform. On one core, blades were struck from striking platforms on opposite ends of the specimen. No measurements are presented.

Group 54: Core Flakes

Five large flakes (one primary decortication flake, two secondary decortication, and two interior flakes) are believed to have been struck to prepare or rejuvenate a core. Four appear to be related to polyhedral cores; one exhibits blade-like scars suggesting a prismatic core. Flake scars cover only the dorsal flake surface. None are heat treated. One item (34-13) shows evidence of battering, suggesting it was struck from a core used as a hammerstone. Table 23 presents measurements.

Modified Flakes and Shatter

Group 56: Worked Flakes

Ten flakes have one margin modified by purposeful retouch; eight are interior flakes, and one each are primary and secondary decortication flakes. Four flakes had the entire dorsal flake margin modified by retouch to form ovate (2) or triangular (2) tools. Table 24 presents the measurements for this group.

There are three straight working elements, all planar in cross section. Angle A ranges from 20 to 35° (with one not measurable); Angle B varies from 50 to 70° with a mean of 61.7°. All exhibit use chip scars.

One subconvex working element (Fig. 17, h), subconvex in cross section, has Angles A and B at 45 and 80°, respectively. There are two convex working elements, both subconvex in cross section. Angle A is 35° (with one not measurable); Angle B is 70 and 75°. Both specimens exhibit use chip scars. These three tools may be spokeshaves.

Two ovate working elements were formed by retouch on the dorsal aspect of the entire flake margin (Fig. 17 b, n). One is subconcave and the other is planar in cross section.

TABLE 23

Core Flakes, 23HI247: Measurements (mm)

Specimen	Length	Width	Thickness	Length Striking Platform	Width Striking Platform	Weight (gm)
1-5	-	-	17	-	-	-
5a	59	40	23	15	15	39.2
13-30	32	70	15	70	11	43.7
34-13	42	38	21	7	3	33.5
36-21	41	35	13	35	13	15.9

Angle A is not measurable; Angle B is 55 and 80°. Both exhibit wear in the form of use chip scars along the entire retouch margin. Both would be classified as ovate scrapers.

Two working elements are triangular in plan view with either subconcave or planar cross sections. One specimen (13-17, Fig. 17, g) was formed by retouch on the entire flake margin, dorsal aspect; the other (13-18, Fig. 17, f) has only the dorsal aspect of the distal margin modified by retouch but exhibits continuous use chip scars along the lateral margins. Angle A is not measurable; Angle B is 75 and 50°. Both exhibit use chip scars along the entire flake margin.

Group 57: Worked Shatter

Three pieces of chert shatter have one margin modified by retouch. Two specimens are interior shatter; one retains cortex. The working elements are: subconvex with irregular cross section; subconcave with a subconvex cross section; and one is indeterminate. Table 24 presents data on this group.

Group 58: Flakes with Fine, Continuous Retouch

Four interior and three secondary decortication flakes have one margin which exhibits fine continuous retouch. Two working elements are too fragmentary to classify. Table 24 presents data on this group.

One straight working element, planar in cross section, has Angle A and B at 35 and 70°, respectively, and exhibits both use chip scars and edge rounding. Two subconvex working elements, planar in cross section have Angle A at 20 and 30°; both have Angle B at 70°. One shows wear in the form of edge rounding while both exhibit use chip scars. One convex working element has a planar cross section; Angle A is not measurable, Angle B is 55°. Wear occurs as both chip scars and edge rounding. One flake has an angular working element, planar in cross section with Angles A and B at 25 and 70°, respectively. It exhibits use chip scars and edge rounding.

TABLE 24

Modified Flakes and Shatter, 23HI247: Measurements (mm)

Group	Specimen	Maximum Length	Maximum Width	Maximum Thickness	Tool Length	Tool Width	Weight (gm)	Angle A (°)	Angle B (°)	Length Working Element	Plan View Working Element: Nominal	Plan View Working Element: Ratio Scale	Cross Section Working Element: Nominal	Cross Section Working Element: Ratio Scale	Flake Type	Flake Outline	Location Working Element	Wear	Figure
56	1-1	48	27	10	27	48	18.4	45	80	34	SCx	1.8	SCx	2.3	I	P	RL,Dr	U	17, h
	3-8	-	-	5	23	18	7.1	-	55	na	Ov	na	SCv	-1.2	I	-	Mr,Dr	U	17, b
	13-1	-	-	21	86	62	111.5	-	80	na	Ov	na	Pr	.0	I	-	Mr,Dr	U	17, n
	13-16	-	-	-	-	-	-	35	70	-	St	.0	Pr	.0	SD	-	Lat,Dr	U	
	13-17	-	-	7	30	25	6.2	-	75	na	Tri	na	SCv	-.5	I	-	Mr,Dr	U	17, g
	13-18	-	-	8	41	34	10.0	-	50	na	Tri	na	Pr	.0	I	-	Mr,Dr	U	17, f
	19-3	37	39	9	39	37	10.6	35	70	31	Cx	5.0	SCx	1.6	I	E	RL,V	U	
	34-10	-	-	-	-	-	-	-	75	22	Cx	6.0	SCx	.5	I	-	-	U	
	35-11	-	-	-	-	-	-	-	65	-	St	.0	Pr	.0	I	-	LL,V	U	
	36-18	-	-	-	-	-	-	20	50	-	St	.0	Pr	.0	PD	-	Dr	U	
57	11-7	na	na	7	22	-	-	-	55	-	SCx	-	Irg	-	Cort	na	na	U	
	13-33	na	na	-	-	-	-	-	50	-	SCv	-	SCx	-	Int	na	na	U	
	35-13	na	na	-	-	-	-	-	90	-	-	-	-	-	Int	na	na	U	
58	6-6	-	-	4	24	26	2.6	25	70	21	Ang	4	Pr	.0	I	E	Ds,V	U,Er	
	15-13	-	-	-	-	-	-	30	70	-	-	-	-	-	I	E	RL,Dr	U	
	19-5	-	-	5	27	26	-	20	70	-	SCx	-	Pr	.0	I	E	Ds,Dr	U	
	34-18	-	-	-	-	-	-	-	55	-	Cx	-	Pr	.0	I	-	LL,Dr	U,Er	
	34-24	-	-	4	-	31	-	35	70	10	St	.0	Pr	.0	SD	E	LL,Dr	U,Er	
	35-35	-	-	4	18	-	-	30	70	20	SCx	2.0	Pr	.0	SD	P	LL,V	U,Er	
	36-26	-	-	-	-	-	-	25	55	-	-	-	-	-	SD	-	-	U	
59	4-4	-	-	-	12	-	-	35	60	-	SCx	-	SCv	-	I	P	RL,Dr	U	
					12	-	-	25	60	-	SCv	-	Pr	.0	-	-	LL,V	U	
	13-22	-	-	-	-	-	-	25	65	-	St	.0	Pr	.0	I	-	Lat,B	BU	
	14-5	-	-	-	-	-	-	25	60	21	St	.0	Pr	.0	I	-	LL,V	U	
	14-6	-	-	12	35	-	-	30	55	-	St	.0	Pr	.0	I	E	RL,V	U	
	24-5	-	-	8	-	-	-	15	60	30	SCx	3.0	Pr	.0	I	E	Ds,Dr	U	
	27-3	-	24	7	22	-	-	60	65	29	SCx	1.0	SCx	1.4	I	C	RL,Dr	U	
					19	-	-	40	55	28	SCv	2.0	Pr	.0	-	-	LL,V	U	
	34-9	-	-	-	-	-	-	30	75	34	St	.0	Pr	.0	I	-	-	U	
	34-12	-	-	-	21	-	-	25	50	23	SCx	2.0	Pr	.0	I	P	Ds,Dr	U	
	34-25	55	23	8	23	55	8.9	40	85	28	SCx	4.0	Pr	.0	SD	P	LL,V	U	
	35-37	-	-	-	-	-	-	20	80	13	Cv	-2.7	Pr	.0	I	-	-	U	
	36-15	21	25	4	24	24	1.9	25	40	22	Cx	4.0	SCx	.8	SD	E	LL,Dr	U	
	36-16	-	-	5	30	-	-	50	60	15	St	.0	SCx	2.0	I	-	LL,Dr	U	

Refer to Table 5 for abbreviations.

Group 59: Utilized Flakes

Ten flakes have one utilized margin, and an additional two flakes have two utilized margins. Twelve working elements are on interior flakes and two are on secondary decortication flakes. All exhibit use chip scars (by definition) while none show edge rounding. Measurements are presented in Table 24.

One working element is concave with a planar cross section, and Angles A and B at 25 and 40°, respectively. The item would be classified as a spokeshave. Two subconcave working elements, planar in cross section, have Angle A at 25 and 40° and Angle B at 60 and 55°. Both occur on the ventral flake aspect and are associated with subconvex working elements on the same flake.

Straight working elements occur on five flakes: four are planar and one is subconvex in cross section. Angle A ranges from 25 to 50° (mean is 32°); Angle B, from 55 to 75° with a mean of 63°. One specimen exhibits bifacial use chip scars.

Subconvex working elements occur on 5 flake margins. Cross sections are planar (3) and one each is subconcave or subconvex. Angle A varies from 15 to 60° (mean of 35°); Angle B, from 50 to 85° (mean of 64°). Two of these are associated with subconcave working elements on the same flake.

One working element is convex in plan view and subconvex in cross section with Angles A and B at 25 and 40°, respectively.

Bifacial Retouch Flakes

Group 62: Bifacial Retouch Flakes

Figure 9 is a frequency histogram of bifacial retouch flakes by provenience. A total of 415 bifacial retouch, 3.1% of all flakes, have angles between 50 to 85°.

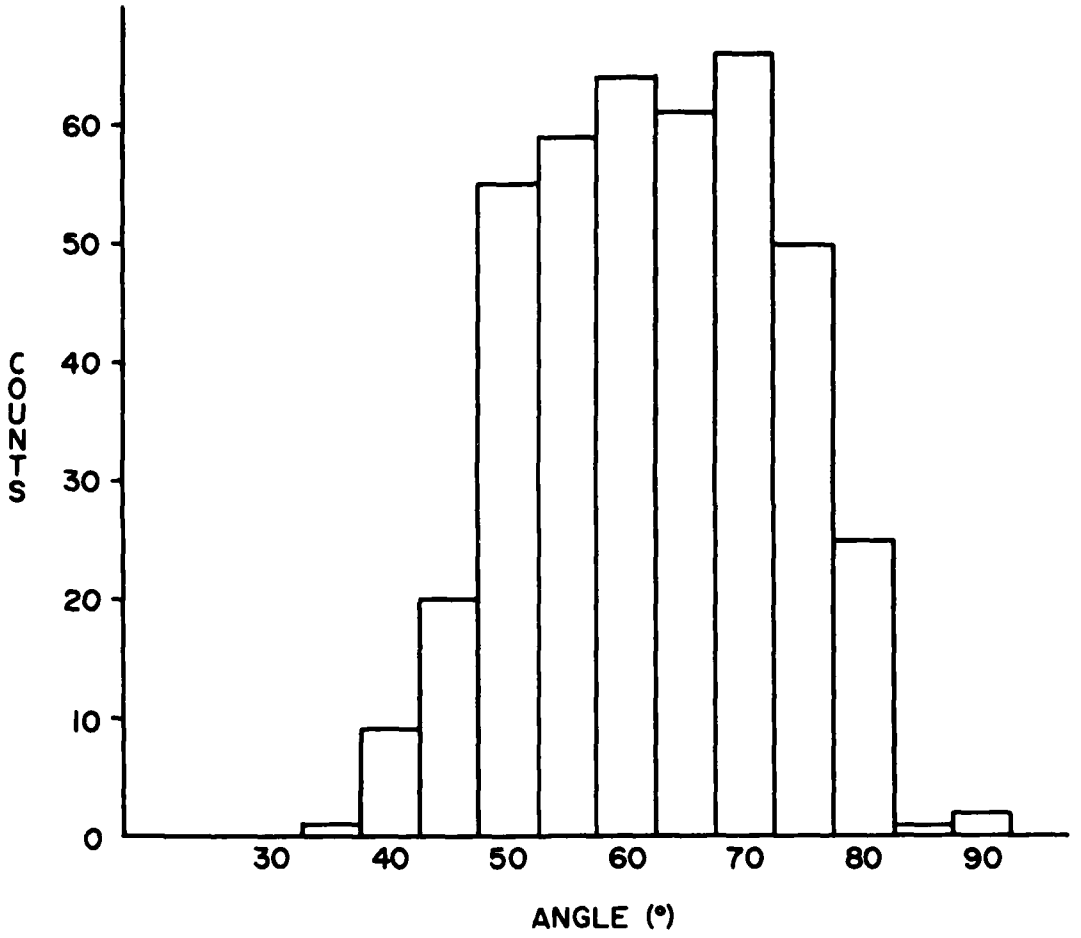

Figure 9. Frequency histogram of bifacial retouch flakes, 23HI247.

GROUND STONE

Group 66: Mano-Hammerstone-Pitted Stone

A single, charred kidney-shaped felcite cobble exhibits evidence of multi-functional use. The more sharply tapered long end is crushed and has a few small flake scars suggesting use as a hammerstone. The opposite polar end is battered and exhibits larger flake scars. The incurved longitudinal margin exhibits striations parallel to the long axis of the tool and the outcurved margin shows smoothing suggesting use as a grinding (mano) stone. Finally, one flat, ground, face has a single irregularly shaped pit at the larger end; the pit is 15 by 11 mm and averages 1.5 mm deep. Table 25 presents measurements for the tool.

Group 70: Ground Pebble

A coarse grained, indurated sandstone pebble, hemispherical in cross section, has the flat surface heavily ground. Measurements are given in Table 25.

Group 71: Ground Hematite

Three pieces of hard, anhydrated hematite show evidence of use in the form of grinding or rubbing. Colors vary from dusky red (10R3/4) to red (10R4/8). One piece is roughly trapezoidal in shape; the other two are irregular: all three are complete. Table 25 gives their measurements.

DEBITAGE

Group 73: Unmodified Flakes, Shatter, and Fall Rock

Table 26 presents the data for these classes of debris. The weights of fall rock (for fragments greater than .64 mm) are biased by the collection technique; fragments of fall rock larger than 10 cm in maximum dimension were discarded in the field. Material recovered by #40 U.S. Standard screening of feature fill is not tabulated here.

There are 12,817 unmodified flakes-flake fragments:

TABLE 25

Ground Stone, 23HI247: Measurements (mm)

Group	Specimen	Length	Width	Thickness	Weight (gm)	Remarks	
66	33-2	142	88	44	705.6		
70	16-3	23	17	8	4.0		
71	11-4	14	13	7	1.1	Ground	10R3/4
	18-1	21	10	8	2.4	Rubbed	10R4/8
	24-7	26	25	18	17.4	Rubbed	10R3/4

TABLE 26

Distribution of Debitage, 23HI247

	Flakes						Shatter		
	Primary Decortication		Secondary Decortication		Interior				Fall Rock (kg)
	W	B	W	B	W	B	Cortical	Interior	
Shelter Surface	2	-	5	-	6	17	1	9	-
Slope Surface	1	-	2	1	--	-	5	5	-
Square 1									
70-80 cm BD	-	-	2	2	42	246	3	64	-
Feature 3	-	3	1	-	42	236	10	62	-
88-96 cm BD	2	2	2	3	45	430	6	91	1.7
96-106 cm BD	-	3	3	3	57	728	7	154	7.5
106-116 cm BD	1	3	3	3	42	387	6	76	5.9
Square 2									
92-102 cm BD	4	19	6	10	152	1,938	30	294	-
102-112 cm BD	3	10	3	13	108	1,790	23	448	22.1
112-122 cm BD	-	1	2	2	30	236	8	94	6.4
122-Br	-	-	-	-	2	17	-	7	.6
Square 3									
68-70 cm BD	-	1	3	1	9	36	1	20	-
Feature 7	-	-	-	-	4	30	-	10	1.1
70-80 cm BD	2	1	-	3	24	166	4	53	8.9
80-90 cm BD	1	1	-	1	21	135	2	25	6.1

TABLE 26: Continued

Distribution of Debitage, 23HI247

	Flakes						Shatter		
	Primary Decortication		Secondary Decortication		Interior				Fall Rock (kg)
	W	B	W	B	W	B	Cortical	Interior	
Feature 3	-	-	-	-	1	1	-	1	.5
90-Br	-	-	-	-	11	49	-	15	2.6
Square 4									
123-125 cm BD	-	-	-	-	-	1	-	-	-
125-135 cm BD	4	2	1	1	40	29	8	40	41.2
135-145 cm BD	-	1	-	1	13	88	1	19	11.8
Feature 9	-	-	3	2	15	132	4	29	5.9
Square 5									
105-108 cm BD	-	-	-	-	6	15	-	5	17.5
108-118 cm BD	-	5	2	1	38	608	10	119	42.5
118-128 cm BD	2	3	1	2	38	523	8	109	31.3
128-Br	-	1	-	-	11	96	4	26	4.9
Square 6									
101-103 cm BD	-	2	-	1	10	61	5	15	-
103-113 cm BD	5	11	4	10	54	730	24	159	17.0
113-123 cm BD	6	12	11	13	88	941	34	188	15.8
123-133 cm BD	6	7	4	7	51	526	29	177	13.2
133-Br	-	1	-	-	4	25	-	8	.6
TOTALS	39	89	58	80	964	11,617	233	2,322	-

12,581 are interior, 138 are secondary decortication, and 128 are primary decortication flakes. Decortication flakes account for 2.1% of the total sample.

There are 2,555 pieces of chert shatter, of which 233 (9.1%) retain some cortex.

BONE TOOLS

Group 74: Bone Object (Fig. 17, a)

The single bone tool was made from a fragment of a large mammal (bison-elk-deer) long bone, it is roughly triangular in outline, with rectanguloid cross sections. The tool has rounded edges, possibly as a result of being rolled in water. In addition, it exhibits polish subsequent to the smoothing. The lower half of the tool is charred; it was burned prior to being polished. Measurements: maximum length, 30 mm; width, 20 mm; thickness 8 mm; weight, 4 gm.

COPPER TOOLS

Group 75: Copper Object

The single metal artifact from the site is a fragment of a rolled native copper tool. It is rolled back on itself by one full turn; if it were extended it would be triangular in shape and 5 mm wide at the base.

Additional evidence of copper artifacts at the site is the presence of a (presumed) copper sulfate stain on one projectile point (24-1, Group 15).

CERAMICS

Two rim and 73 body sherds are grouped into eight ceramic types, based on the size and kind of temper and exterior surface treatment. Additional categories include: ground sherd, clay object, and fired clay. Descriptions follow the format in Vehik (1974) and Chomko (1976).

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Ceramics 1: Plain, very fine grit tempered

Sample: 5 body sherds

Paste

Temper: very fine grit (maximum dimension .5 mm)

Texture: paste is compact, breaks are irregular with rounded edges

Color: interior: reddish gray (5YR5/2)
exterior: gray (5YR6/1)

Method of Manufacture: indeterminate

Surface Finish: both surfaces smoothed, temper protrudes on both sides

Decoration

Lip and Rim: indeterminate

Body: plain

Form

Lip and Rim: indeterminate

Body: indeterminate; wall thickness varies between 7 to 9 mm

Ceramics 2: Cordmarked, very fine grit temper (Fig. 17, m)

Sample: 5 body sherds

Paste

Temper: very fine grit (maximum dimension .5 mm)

Texture: paste is compact, breaks are irregular

Color: interior: black (5YR2/1)
exterior: gray (5YR6/1)

Method of Manufacture: indeterminate

Surface Finish: exterior surface is cordmarked with regularly spaced, vertical, parallel z-twist impressions; interior surface is smoothed

Decoration

Lip and Rim: indeterminate

Body: cordmarked

Form

Lip and Rim: indeterminate

Body: indeterminate; wall thickness varies from 9 to 13 mm

Ceramics 3: Plain, fine grit tempered (Fig. 17, j)

Sample: 1 rim and 14 body sherds

Paste

Temper: fine grit (ranges from .7 to 1.5 mm)

Texture: paste is compact; breaks tend to be straight with angular edges

Color: interior: dark reddish brown (10R3/1)
exterior: reddish gray (5YR5/2) to reddish yellow (5YR6/6)

Method of Manufacture: indeterminate

Surface Finish: both surfaces are smoothed

Decoration

Lip: plain

Rim: Indeterminate

Body: plain

Form

Lip: rounded; 6 mm thick

Rim: indeterminate

Body: indeterminate; wall thickness varies from 5.5 to 8.5 mm

Ceramics 4: Plain, coarse grit tempered

Sample: 8 body sherds

Paste

Temper: coarse grit (ranges from 1 to 3 mm)

Texture: paste is compact; breaks are irregular

Color: interior: reddish gray (10R5/1)
exterior: light brown (7.5YR6/4)

Method of Manufacture: indeterminate

Surface Finish: both interior and exterior surfaces are smoothed

Decoration

Lip and Rim: indeterminate

Body: smoothed

Form

Lip and Rim: indeterminate

Body: indeterminate; wall thickness ranges from 8 to 10 mm

Ceramics 5: Cordmarked, coarse grit tempered (Fig. 17, i)

Sample: 6 body sherds

Paste

Temper: coarse grit (1 to 3 mm) with some crushed limestone

Texture: compact paste; irregular breaks

Color: interior: dark brown (7.5YR3/2)
exterior: brown (7.5YR5/2)

Method of Manufacture: indeterminate

Surface Finish: the exterior surface is impressed with irregularly spaced and overlapping z-twist cord impressions; interior surface is smoothed; temper protrudes through exterior surfaces

Decoration:

Lip and Rim: indeterminate

Body: cordmarked

Form

Lip and Rim: indeterminate

Body: indeterminate; wall thickness varies from 9 to 11 mm

Ceramics 6: Plain, crushed limestone tempered (Fig. 17, l)

Sample: 1 rim and 5 body sherds

Paste

Temper: coarse, crushed limestone (varies from 1 to 8 mm)

Texture: compact paste; breaks are relatively straight

Color: interior: reddish yellow (5YR6/6)
exterior: yellowish red (5YR4/6)

Method of Manufacture: indeterminate

Surface Finish: both surfaces are smoothed; temper protrudes from both surfaces

Decoration

Lip: plain

Rim: indeterminate (exfoliated)

Body: plain

Form

Lip: slightly convex; 8 mm thick

Rim: excurvate

Body: indeterminate; wall thickness ranges from 8 to 9 mm

Ceramics 7: Porous, no temper remaining (Fig. 17, k)

Sample: 5 body sherds

Paste

Temper: the major fraction of the temper is indeterminate (its presence is indicated by many small pores in the sherds) but may have been shell; a few fine grit sized particles are present

Texture: paste is friable, porous; breaks are straight

Color: interior: dark reddish brown (5YR2/2)
exterior: reddish brown (5YR5/3)

Method of Manufacture: indeterminate

Surface Finish: both surfaces smoothed; pores indicate temper protruded through the surface

Decoration

Lip and Rim: indeterminate

Body: plain

Form

Lip and Rim: indeterminate

Body: indeterminate; wall thickness ranges from 5 to 8 mm

Ceramics 8: Miscellaneous sherds

Twenty-five sherds are too small (or are too exfoliated) to classify as to surface treatment. Temper is similar to that in the above described categories.

Ceramics 9: Ground sherd (Fig. 17, c)

One sherd, with fine grit temper, has both surfaces ground to a tapered edge. The item is ovate in plan view and concavo-convex in cross section. Length, 24 mm; width, 19 mm; thickness, 6 mm; weight, 3.7 gm.

Ceramics 10: Clay object (Fig. 17, d)

One piece of untempered fired clay, broken at both ends, is roughly cone-shaped, with an ovoid cross section. The item does not appear to be part of a ceramic vessel.

Ceramics 11: Fired clay

A total of 65 fragments of fired untempered clay were collected. The fragments vary in size and shape and appear to be results of accidental firing.

HUMAN REMAINS

A single right central mandibular incisor from a juvenile individual was 118 to 128 cm. below datum

in Square 5. Bass (1971: 13) indicates that at 6½ years the deciduous teeth begin to be replaced, with the central incisors lost first; the calcified root indicates the tooth was not lost before age 6½.

FAUNAL REMAINS

Invertebrates: A minimum of 13 species of mussels are represented by 180 identified valves (Table 27). Three species, Eliptio dilatatus, Amblema costata, and Actinonaias carinata, account for 62.8% of the identifiable valves; Actinonaias ellipsiformis and Ligumia recta represent an additional 11.7%. The figures for identified valves are counts of the right and left sides (matching of valves indicates each valve represents an individual). The weight of the unidentifiable shell is presented. The mussels exhibit a wide range in shell size, and include subadult individuals.

Gastropods from the water screening samples are being sorted and will be submitted for identification.

Vertebrates: A minimum of 32 species, representing all five families, were identified from 161 elements. There were an additional 3236 unidentifiable bone fragments (greater than .64 mm) of which 1287 (39.8%) are burned. The low percentage (4.8%) of identifiable to unidentifiable bone may reflect utilization processes. Table 28 presents distributional data on the identifiable and unidentifiable bone. All species, except as noted below, are represented by a minimum of one individual. Minimum numbers were determined on the basis of the entire sample since clearly demarcated strata or cultural units could not be determined (see Grayson 1973). Although the features are distinct cultural units, there is no reason to assume bone from a single individual is confined to a single feature.

TABLE 27

Distribution of Naiades, 23HI247

	Fusconia flava	*c.f. F. flava* (juvenile)	*Amblema costata*	*Cyclonais tuberculata*	*Quadrula pustulosa*	*Tritogonia verrucosa*	*Pleurobema cordatum*	*Elliptio dilatatus*	*Alasmidonta calceolus*	*Aetinonaias carinata*	*A. c. gibba*	*A. ellipsiformis*	*Carunculina parva*	*Ligumia recta*	*Lampsilis ovata ventricossa*	Totals	Unidentifiable fragments (weight, gm)
Shelter surface										1						1	
Slope surface					1	1	1			2		1				6	253
Square 1																	
70-80 cm BD									1							1	110
Feature 3																1	54
88-96 cm BD																	20
96-106 cm BD							1									2	146
106-116 cm BD			1													1	175
Square 2																	
92-102 cm BD			6				2	3		1		2				14	261
102-112 cm BD	2		1				1	3								7	540
112-122 cm BD	1		1		1			2				1				6	111
122-Br.																	18
Square 3																	
68-70 cm BD																	5
Feature 7																	3
70-80 cm BD			1													1	25
80-90 cm BD																	22
Feature 3																	-
90-Br.												1				1	33
Square 4																	
123-125 cm BD																	-
125-135 cm BD										1						1	11
135-145 cm BD																	19
Feature 9																	52
Square 5																	
105-108 cm BD																	2
108-118 cm BD	1							1								2	129
118-128 cm BD	1							1	1			1				4	186
128-Br.																	40
Square 6																	
101-103 cm BD																	20
103-113 cm BD	3	1	4		1	1	1	10	1	8		1		1		33	700
113-123 cm BD	5		11	1	1	1	2	27		15	1	4	1	6	1	76	1,144
123-133 cm BD	3		5		1		2	3	1	5		2		1		23	556
133-Br.																	9
TOTAL	18	1	30	1	5	4	10	50	4	33	1	13	1	8	1	180	

Table 28. Distribution of Faunal Remains, 23HI247

Species	Square 1					Square 2				Square 5			Square 6					
	70-80 cm BD	Feature 3	88-96 cm BD	96-106 cm BD	106-116 cm BD	92-102 cm BD	102-112 cm BD	112-122 cm BD	122 cm BD-Bedrock	108-118 cm BD	118-128 cm BD	128 cm BD-Bedrock	101-103 cm BD	103-113 cm BD	113-123 cm BD	123-133 cm BD	133 cm BD-Dedrock	Totals
Fish																		
Bowfin (Amia calva)														1	1			2
Redhorse (Moxostoma sp.)													1					1
Sucker (Catostomus sp.)														1				1
Catfish (Ictalurus sp.)							1	2										3
Unidentifiable Fish[i] (Pisces)				1			2				1			4	36	11	1	57
Amphibian																		
Toad (Bufo sp.)														1				1
Reptile																		
Soft Shell Turtle (Amyda sp.)	1			2									1	1				5
Mud Turtle (Kinosternom sp.)	1																	1
Box Turtle (Terrapene sp.)	1			2			1						1	1	2	2		10
Red-eared Turtle (Pseudomys cf. scripta)															1			1
Turtle (Pseudomys-Chrysemys-Graptomys Group)							4	1				1			1	1		8
Unidentifiable Tutle[ii] (Testudines)	4	6		3	3	3				3	2		2	17	6			50
Unidentifiable Lizard (Squamata)															1			1
Diamond-backed Water Snake (Natrix sipedon)			1		1	1	1											4
Copperhead Snake (Agkistrodon contortris)					1		1											2
Timber Rattlesnake (Crotalus horridus)															1	1		2
Unidentifiable Snake (Serpentes)				1							1							2
Bird																		
Wild Turkey (Maleagris gallopavo)								1										1
Sandhill Crane (cf. Grus canadensis)															1			1
Unidentifiable Bird[iii] (Aves)	4										2			2	7	3		19

Table 28 (cont'd.)

Species	Square 1					Square 2				Square 5			Square 6					Totals
	70-80 cm BD	Feature 3	88-96 cm BD	96-106 cm BD	106-116 cm BD	92-102 cm BD	102-112 cm BD	112-122 cm BD	122 cm BD-Bedrock	108-118 cm BD	118-128 cm BD	128 cm BD-Bedrock	101-103 cm BD	103-113 cm BD	113-123 cm BD	123-133 cm BD	133 cm BD-Bedrock	
Mammals																		
Bat (Eptesicus fuscus	1		2	1				3		2								9
Rabbit (Sylvilagus sp.)				2												1		3
Eastern Chipmunk (Tamias striatus)														1				1
Woodchuck (Marmota monax)	2			2											1			5
Fox Squirrel (Scurius niger)			1	1											2	1		5
Squirrel (Scurius sp.)				1											1	1		3
Southern Flying Squirrel (Glaucomys volans)															1			1
Woodland White-footed Mouse[iv] (Peromyscus cf. leucopus)								1										3
Prairie Meadow Mouse (Microtus cf. ochrogaster)															2			2
Unidentifiable Rodent (Rodentia)			4		2						1			1				8
Canid (Canis sp.)					2													2
Gray Fox (Urocyon cinereoargenteus)				1														1
Raccoon[v] (Procyon lotor)							2	2							1			6
Striped Skunk (Mephistos cf. mephistos)					1					1	1				2			5
Bob Cat (Lynx rufus)						1	1											2
Elk (Cervus canadensis)													1					1
Deer[vi] (Odocoileus sp.)	7	4	2	6	3	2	11		1	1	2			6	12	10		68
Bison (Bison bison)														1				1
Unidentifiable[vii] Small Mammal	104	23	10	40	16	34	57	52		11	11	3	3	40	65	55	4	566
Large Mammal	166	54	7	38	37	62	79	26	1	30	27	7		69	117	47		828
Indeterminate	55	66	45	121	54	170	218	47	2	61	51	6		112	344	239	91	1705

i. An additional element was in the 80-90 cm level of Square 3.
ii. An additional element was in Feature 9 of Square 4.
iii. An additional element was in the 70-80 cm level of Square 3.
iv. Two additional elements were in a raccoon scat on the shelter surface.
v. An additional element was in the 125-135 cm level of Square 4.
vi. An additional element was in Feature 9 of Square 4.
vii. Unidentifiable mammal elements from Squares 3 and 4 are included in the row totals.

Turtle (Pseudemys-Graptemys-Chrysemys Group), bat, squirrel, and striped skunk are represented by a minimum of two adult animals (all epiphyses fused) while an adult and subadult (epiphysis not fused) raccoon is present. Deer (probably Odocoileus virginianus) is represented by two adult, one subadult, and one possibly fetal individual. Deer appear to be the dominant faunal resource (based on the number of individuals); however, using White's (1959) figures, either the bison or the elk would have supplied as much usable meat as all the deer. Since both of the latter were near the surface of Square 6, it is suggested that deer was the major faunal resource throughout the occupation of the shelter while bison and elk represent the dominant faunal resources during the final stage of site use.

FLORAL REMAINS

The analysis of the floral remains is as yet incomplete. Seeds and plant fragments have been recovered from most features and from the general level matrix in all squares. A preliminary sorting and identification indicates hackberry is the dominant seed type, with hickory, walnut and acorn prominent.

Discussion

INTRASITE COMPARISON

The placement of the excavation units should afford some insight into the location of use areas in the shelter. The thin deposit limits the discussion of vertical distribution. Table 29 presents distributional data on the artifacts.

Point Groups 1A, 1C, 2A, 2B, 3, and 4 are generally considered to be arrowpoints on the basis of size and weight (Fenenga 1953). The small triangular unnotched and side notched forms are generally associated with shell tempered ceramics, and are considered to be indicative of Mississippian influence or contact (Chapman 1954, Wood 1961: 67). The Group 1A and 1C points have a suggested time range of AD 800 to 1600 (Vehik 1974: 102); the Group 2A, 2B, and 3 forms have a temporal span of AD 500 to 1200 (Wood and McMillan 1969: 17).

The Group 4 corner-notched arrowpoints are within the range for Scallorn points (Bell 1958: 84-85), considered a late Woodland form (Chapman 1954: 49) and assigned a temporal duration of AD 500 to 1200 (Wood and McMillan 1969: 17).

Contracting stem points, Group 5, defined as Langtry points (Bell 1958: 38-39) are associated with ceramics and have a temporal duration of AD 1 to 1000-1200 in the reservoir area (Chomko 1976: 99-100). Large shallow side-notched points, Group 6, defined as Rice Side Notched by Bray (1956: 17), are invariably associated with ceramics and have a suggested temporal span of AD 500 to 1200 (Wood and McMillan 1969: 17). Points similar to those in Groups 9 and 11 have been found in ceramic contexts in the reservoir area (McMillan 1965: 366-367, Falk and Lippincott 1974: 45, and Chomko 1976: 101, among others). The Group 15 point has no reported parallels but may be a reworked Rice Side Notched point.

There is no vertical separation in the distribution of the projectile points. The cultural assemblage may thus be defined as a Late Woodland manifestation with characteristics indicative of Mississippian influence or contact. The site may be considered a single component composed of multiple occupation.

Wear on the arrowpoints in Groups 1A, 1C, 2A, 2B, and 3 supports the interpretation of their use as projectiles (only 2 of the 26 points exhibit use chip scars). However, the Group 4 points exhibit wear indicative of multi-functional use: of the 10 specimens with blades complete enough to determine edge wear, 4 exhibit use chip scars (one of which is also impact fractured). Two additional points are impact fractured but edge wear is indeterminate. Thus, the Scallorn point may be considered as a projectile and a hafted cutting tool (see Ahler and McMillan 1976). The point in Group 5 is impact fractured suggesting use as a projectile while those in Groups 6, 9, and 15 show wear indicative of cutting and scraping as do most of the point segments in Groups 17, 18, and 19.

Both of the drills (Groups 23 and 24) may be interpreted as hide or wood working tools.

Bifaces tend to be distributed in the upper levels of Squares 1 and 2 and throughout Square 6. The Group 27, 32 and 38 specimens may be preforms while the remaining items exhibit wear and edge angles indicative of cutting and scraping tools (see Wilmsen 1970).

The modified flakes have a distribution paralleling that of the bifaces. Wear on these items indicates use as cutting and scraping tools; some forms are traditionally associated with wood working activities (i.e., graver and spokeshave-like tools).

Cores are distributed through the site much the same as the bifaces, while bifacial retouch flakes have a wide distribution but tend to be concentrated in Squares 1, 2 and 6. Both of the above categories are indicative of lithic reduction activities.

Unmodified flakes occur most frequently in Squares 1, 2, 5, and 6. Decortication flakes account for only 2.1% of the unmodified flakes, which suggest lithic

reduction of raw material was not an important activity at the site. The low percentage of bifacial retouch flakes (3.1%) suggests that biface reduction or tool sharpening was of minimal importance. It should be noted that outcrops of chert on the hillslope above the shelter may have been quarried (a few flakes and 1 biface were collected in the area) with the major reduction of raw material taking place away from the site. Also, the unmodified flakes from 23HI246 (less than 45 m east of Beck Shelter) indicates primary lithic reduction was an important activity there.

The mano-hammerstone-pitted stone, interpreted as a vegetal food processing tool, was on the surface of Square 6. The ground pebble (indeterminate function) was near the base of Square 2. Ground hematite, indicative of pigment processing, was near the base of Square 1 and near the surface of Squares 3 and 4.

The bone object was near the surface of Square 6 and the copper object was in Feature 3.

Ceramics are distributed throughout the deposits. Grit (the dominant temper type) and the few limestone tempered sherds are associated, with grit tempering stratigraphically earlier. At Blackwell Cave, grit tempering is a minor form but predates limestone tempering (Falk 1969: 87). The ground sherd and clay object were near the base of Square 2 and on the surface of Square 3, respectively.

The single human bone, a deciduous tooth, was in the second level above bedrock in Square 5. The tooth suggests the use of the shelter by a family unit on at least one occasion.

Features occur vertically throughout the deposits but, except for two features in Square 4, all are in the western part of the site. Features 4 through 8 may be interpreted as hearths; Features 3 and 9 represent intense

fire use activity. Feature 3 is a massive concentration of ash, Feature 9 is a large deposit of charred wood and fire shattered limestone. The contents of Feature 3 suggest it represents a meat processing activity (contents include arrowpoints, cutting and scraping tools and faunal remains). The contents of Feature 9 are somewhat ambiguous; it may represent a food preparation activity (for meat, vegetal food, or mussels). The large amount of charred wood and the relative absence of ash suggests the fire did not burn in the open.

Freshwater mussels occur throughout the matrix but are concentrated in Square 6 and, to a lesser extent, in Square 2. There is no appreciable change in the relative percentage of a species through time. The increase of shell in the middle levels of the site may indicate a change in reliance on mussels. The variety of species present and the range in shell size suggest all available mussels were being collected rather than the exploitation of a particular species.

Habitat data for the mussels were taken from Utterback (1916), Parmalee (1967), and Murray and Leonard (1962). Fusconia flava, Quadrula putulosa, Tritogonia verrucosa, Pleurobema cordatum, Elliptio dilatatus, and Cyclonais tuberculata are all wide ranging species while Amblema costata, Actinonaias carinata and Ligumia recta prefer large rivers with a strong current and rocky or gravelly bottoms. Alasmidonta calceolus, Actinonaias ellipsiformis, and Lampsilis ovata ventricossa are most common in small shallow streams with a sand or gravel bottom. Only Carunculina parva prefers a small stream with a muddy bottom. While the Pomme de Terre, Bell Branch, and the junction of the two provide a suitable habitat for all species, it appears that the major components of the naiad assemblage were collected from the Pomme de Terre River.

All vertebrate species except turtle (P-G-C group), bat, squirrel, raccoon, striped skunk, and deer are represented by single individuals. Deer was the dominant faunal resource throughout the occupation of the shelter while bison and elk were major resources during the final stages of site use. Both the latter species become more important in the latter ceramic levels of Blackwell Cave (Falk 1969: Table 12) and Saba Shelter (Vehik 1974: 95).

The distribution of the faunal remains, near the mouth of the shelter and outside the overhang, appears to be typical of rockshelters in general, and appears to represent the deposition of food remains outside the "living" area. Whether the remains are indicative of primary or secondary deposition is indeterminate (see Schiffer 1972).

The thanatocoenosis at Beck Shelter was formed by a combination of factors. Some species are present as a result of passing through a cultural filter; they represent culturally utilized species. A second group of species represent natural (in this case noncultural) deposition and may be referred to as the "proximal community." The proximal community is composed of species which normally utilized the shelter environs as part of their habitat. These individuals are present as a result of dying in the shelter or represent food waste from nonhuman predators (deposited as uneaten bone scrap or bone that survived the digestive process). It then becomes necessary to distinguish between the proximal community and the culturally deposited bone, otherwise conclusions regarding subsistence or environment would be biased by mixing the two samples.

One possible method for distinguishing species of the proximal community would be to compute the relative degree of skeletal completeness (see Ziegler 1973 and Shotwell 1955 and 1958). Species which died in the shelter would be expected to have relatively complete skeletons as

opposed to the remains of culturally utilized species or species representing prey of nonhuman predators. The latter may be distinguished by different characteristics of the broken bone (see Bonnichsen 1973). Of course some species will be members of both populations; e.g., raccoon is thought to be a major component of the Rodgers Shelter cultural fauna but is also a prey species of canids who might use the shelter as a den.

An alternative method of distinguishing the two populations would be to investigate an unutilized part of the shelter or an unoccupied nearby rockshelter from which to compute the proximal community—differences between that and the occupied shelter would be expected to yield the culturally utilized species. A third situation exists at Rodgers Shelter: there are two samples of fauna there: one from within the shelter and one from the terrace outside the overhang. The latter sample of bone would be expected to yield primarily a cultural biota. Differences between the two samples would separate the proximal community (of the shelter, biased somewhat by the proximal community of the terrace). Unfortunately, the fauna from Rodgers Shelter was not identified in enough detail to permit the analysis.

The bone sample from Beck Shelter is too small to permit computing the degree of skeletal completeness, nor does the situation exist to permit use of the other methods for separating faunal communities. However, comparison with other sites may allow some insight into the problem. Bison, deer, elk, raccoon, squirrel, rabbit, crane (?), turkey, turtles, and fish have been considered food species at other sites in the area (Falk 1969, Vehik 1974, McMillan 1971 and 1976). From habitat characteristics we may infer that toad, lizard, bat, chipmunk, and mice represent members of the proximal community. Questionable species are,

then: snakes, woodchuck, flying squirrel, canid, fox, skunk and bob cat—all of which could conceivably utilize the shelter but which may also represent culturally procured animals. It should be stressed that the above is a probabilistic statement, not an "either...or" situation.

Some tentative conclusions may be generated from the above data:

(1) The vertical distribution of projectile point types and ceramics suggests the site represents a single component which witnessed several occupations.

(2) The cultural material is indicative of a Late Woodland complex with some characteristics associated with Mississippian influence or contact.

(3) The deciduous human tooth indicates that on at least one occasion the site was occupied by a family unit which included a juvenile individual.

(4) Activities which took place at the site or in the site area include: hunting-butchering, mussel gathering, vegetal food processing, containment, fire use activity, hide and wood working, lithic reduction (but not primary reduction of raw materials), and pigment processing.

(5) Deer was the dominant resource throughout the occupation of the shelter while bison and elk become important in the later stage of site use.

(6) Freshwater mussels, if not a major resource, were an important supplement to the diet. Changes in the relative number of mussels suggest they declined in importance with time. The major components of the naiad fauna were collected from the Pomme de Terre River with procurement directed toward a wide range of available species.

Table 29. Distribution of Artifacts, 23HI247

			Square 1						Square 2				Square 3					Square 4			Square 5				Square 6				
Group	Shelter Surface	Slope Surface	70-80 cm BD	Feature 3	88-96 cm BD	96-106 cm BD	Feature 4	106-116 cm BD	92-102 cm BD	Feature 3	102-112 cm BD	112-122 cm BD	68-70 cm BD	Feature 7	70-80 cm BD	80-90 cm BD	90 cm BD-Bedrock	123-125 cm BD	125-135 cm BD	Feature 9	105-108 cm BD	108-118 cm BD	118-128 cm BD	128 cm BD-Bedrock	101-103 cm BD	103-113 cm BD	113-123 cm BD	123-133 cm BD	Totals
1A			2			2			1	1	1						1										1		9
1C									1																				1
2A								8	1	1	1							1				1					1	2	9
2B					1				1	1																	1	1	5
3										1															1				2
4			2	2						1	1						1	1				1	1	1	2	7	4	24
5											1																		1
6									2		2																		4
9		1																											1
11			1																										1
15																		1											1
16				1							1																		2
17											1							1				1			1	2			6
18									2		1										1					1			5
19			2			2		1	1		1										1				1	1	2		12
23			1																										1
24																1													1
27						1					1							1											3
31									1																				1
32		1																											1
34									1		1																		2
35	1			1																									2
38	2																								1		1		4
39			1						1																				2
40																									1		1		2
41					1						1																		2
42																									1				1
44																									1	2			3
45		2							9																				3
48				1	1			1	4		2							1				2			3	1	2		18
49			1								1																		2
50																											1		1
52	1					1			5																				7
53					1				1																				2
54	1			1					1																1		1		5
56	1		1						4						1										1	1	1		10
57								1	1																	1			3
58						1					1				1										2	1	1		7
59			1						1	2							1		1						3	1	2		12

Table 29 (cont'd.)

			Square 1						Square 2				Square 3					Square 4			Square 5				Square 6				
Group	Shelter Surface	Slope Surface	70-80 cm BD	Feature 3	88-96 cm BD	96-106 cm BD	Feature 4	106-116 cm BD	92-102 cm BD	Feature 3	102-112 cm BD	112-122 cm BD	68-70 cm BD	Feature 7	70-80 cm BD	80-90 cm BD	90 cm BD-Bedrock	123-125 cm BD	125-135 cm BD	Feature 9	105-108 cm BD	108-118 cm BD	118-128 cm BD	128 cm BD-Bedrock	101-103 cm BD	103-113 cm BD	113-123 cm BD	123-133 cm BD	Totals
62	1		18	9	19	29		28	66	15	70	10	1		5	8	4	2	7	5		16	18	3		28	29	24	415
66																									1				1
70												1																	1
71								1						1				1											3
74																										1			1
75										1																			1
Ceramics																													
1		1										2														2			5
2						2					1											1				1			5
3		2						1														1			4	4	3		15
4		1						1														3	1			1	1		8
5		1				1					3																1		6
6							1				2														2	1			6
7	1														1											4			5
8		1		1		6		5	1																3	7	1		25
9												1																	1
10																					1								1
11										14		3										4			11	21	12		65

(7) The presence of fish, turtle, and mussels is suggestive of a warm season occupation; the crane was most likely collected during the period of its migration (early spring or late fall); there are no indicators of cold weather occupation.

(8) The distribution of tool types, features, and debitage, and faunal remains suggest the area outside the shelter overhang is a refuse area; that most fire related activity (particularly hearths) took place on the western portion of the shelter; and that the central part of the shelter represents a "living" area (evidenced by lack of debris).

(9) A final observation is offered with some reservation: although the riverine environment appears to have remained constant, the presence of two major grassland species (bison and elk) suggests either a change in exploitative pattern or an environmental change favoring grassland expansion during the terminal stage of site use.

INTERSITE COMPARISON

Six projectile point groups are considered to be arrowpoints (Groups 1A, 1C, 2A, 2B, 3, and 4) based on size and weight (Fenenga 1953). Small unnotched triangular points (Group 1A and 1B) were recovered in late ceramic contexts at Rodgers Shelter (McMillan 1965: 378), Saba Shelter (Vehik 1974: 39), the Fulton Site (Lippincott 1972: 46-47), Blackwell Cave (Wood 1961: 58 and Falk 1969: 72), and Phillips Spring (Chomko 1976: 99). Wood (1961: 67) reports similar points from the Mississippian Vista Shelter and in components of the Fristoe Burial Complex (Wood 1967). Small triangular points, usually associated with shell tempered ceramics, are indicative of relative lateness in time,

about AD 800 to 1600 (Vehik 1974: 102). The presence of small unnotched and side-notched triangular projectile points has been interpreted as evidence of influence or contact with Mississippian groups during the Late Woodland period, about AD 400 to 900 (Vehik 1974: 107-108).

Points similar to the Group 2A and 2B (small side-notched) and Group 3 (small shallow side-notched) points were in the upper ceramic levels of Saba Shelter (Vehik 1974: 39), Rodgers Shelter (McMillan 1965: 354), Blackwell Cave (Wood 1961: 58 and Falk 1969: 49-50), Phillips Spring (Chomko 1976: 90), in the Mississippian component at Vista Shelter (Wood 1961: 67), and the most recent components of the Fristoe Burial Complex (Wood 1967: 113). At Saba Shelter, Vehik (1974: 102) interprets the presence of these points as indicative of Mississippian influence, while Chapman (1954: 52) states the point form is characteristic of Mississippian groups. Wood and McMillan (1969: 17) suggest a temporal duration of AD 500 to 1200 for the point form.

The Group 4, small corner-notched points, are in the range reported for Scallorn points (Bell 1958: 84-85). They are found associated with ceramics at the Miller Site and Saba Shelter (Vehik 1974: 22, 99), Rodgers Shelter (McMillan 1965: 354 and 1966: 17), the Fulton Site (Lippincott 1972: 11), and Blackwell Cave (Wood 1961: 58 and Falk 1969: 79). They are a common point form in most components of the Fristoe Burial Complex (Wood 1967: Table 1). Chapman (1954: 49) suggests they are a Late Woodland form and Wood and McMillan (1969: 17) assign them a temporal duration of from AD 500 to 1200.

The distribution of arrowpoint types at Beck Shelter indicates all forms overlap in time with the suggestion that Group 4 specimens are stratigraphically oldest (one point near the base of Square 2). Mississippian-like forms co-occur with the supposed Late Woodland form—a situation

which holds in all late ceramic components in the reservoir area, except for Phillips Spring. Scallorn points are the only arrowpoint type at the Miller Site (Vehik 1974), the Don Bell Site (Grimshaw 1965), Thurman and Drut Knolls Sites (Falk and Lippincott 1974), and 11 components of the Fristoe Burial Complex (Wood 1967: Table 1). However, Mississippian points occur stratigraphically below the Scallorn form at Blackwell Cave (Falk 1969: Table 16), Saba Shelter (Vehik 1974: Table 27), and possibly Rodgers Shelter (McMillan 1965: Tables VI and VII) but in all cases this is based on the presence of a single point. In sites where the two forms co-occur, the small corner-notched point is the most common (except Vista Shelter and Blackwell Cave). If the Scallorn point is an indigenous Late Woodland form and the Mississippian points were introduced at a later time, one would expect the relationship to be evidenced in the stratigraphic record. However, such a situation is only <u>suggested</u> at Beck Shelter while the reverse (e.g., Mississippian forms predating Scallorn forms) seems to hold true. This discussion will be continued under the comparison of ceramics.

Contracting stem points with concave bases (Group 5) fall within the reported range for Langtry points (Bell 1958: 38-39). Similar points, usually associated with ceramics at stratified sites in the reservoir area, occur at the Fulton Site (Lippincott 1972: 12-13), the Thurman Site (Falk and Lippincott 1974: 49), the Miller Site and Saba Shelter (Vehik 1974: 22-24, 104-107), the Merideath Site and Blackwell Cave (Falk 1969: 33-34, 80), Phillips Spring (Chomko 1976: 90-93), Rodgers Shelter (McMillan 1965: 362, 365 and 1966: 49), and the Lindley Focus of the Highland Aspect (Wood 1961: 104). The point form has a suggested temporal duration of AD 1 to 1000-1200 (Chomko 1976: 99-100).

Group 6 (large, shallow side-notched) points have been defined as Rice Side Notched points by Bray (1956: 17).

Similar points occur in ceramic context at Rodgers Shelter (McMillan 1965: 358), Blackwell Cave (Wood 1961: 58 and Falk 1969: 52), Saba Shelter (Vehik 1974: 99), the Fulton Site (Lippincott 1972: 47), and are common in many components of the Fristoe Burial Complex (Wood 1967: 113). Rice Side Notched points are associated with the Highland Aspect (Chapman 1948), and Wood and McMillan (1969: 17) suggest a temporal duration of from AD 500 to AD 1200 for them.

Vehik (1974: Fig. 9, q) illustrates a specimen similar to the Group 9 point which he categorizes as an "expanding base corner-notched" form but it is not possible to determine its cultural affiliation. McMillan (1965: 366-367) reports similar points (Category ES1) in a ceramic context at Rodgers Shelter.

The large corner-notched points with convex bases (Group 11) are similar to a narrow notched variety of corner-notched points, found in ceramic contexts, at the Thurman Site (Falk and Lippincott 1974: 45, Table 4), Phillips Spring (Chomko 1976: 101) and Saba Shelter (Vehik 1974: 104). It should be noted that corner-notched points have a long temporal duration in the reservoir area and are found in both preceramic and ceramic contexts at Rodgers Shelter (McMillan 1965: 364-367), the Merideath Site and Blackwell Cave (Falk 1969: 37, 85-86 and Wood 1961 for the latter), Phillips Spring (Chomko 1976: 99-101), and the Thurman Site (Falk and Lippincott 1974: 45). However, a chronological distinction based on relative notch width suggests the narrow notched variety occurs later in time (see Chomko 1976: 99-100, among others).

The Group 15 point form is not represented at other stratified sites in the reservoir area. This point may be a reworked Rice Side Notched form and, as such, would be placed in a ceramic context.

The two drills, Groups 23 and 24, have parallels in drills and drill-like implements from other sites in the area. In general, drill form (other than those made from projectile points) tends to be amorphous and nondiagnostic.

The copper object is too fragmented to determine its complete form. The only other reported copper item found in the reservoir area is a possible copper bead from Burial 2 of the Fairfield Mound 1 (Wood 1967: 19). Wood (1967: 120) suggests the Fairfield Mound group is evidence of contact with Mississippian groups.

The impoverished inventory of ceramics from the site makes comparison with other samples difficult. No decorative elements (other than cordmarking as a surface treatment) are present and the two rim sherds are nondiagnostic. A rough temporal sequence of ceramics based on temper type shows that although grit temper is a minor type usually associated with limestone-tempered sherds, the former does occur earlier (Falk 1969: 87). Both temper types are associated with Late Woodland complexes in the reservoir area (Vehik 1974: 106 and Chomko 1976: 104). Shell tempering (associated with small unnotched and side-notched triangular points) has been considered as characteristic of Mississippian influence (Vehik 1974: 105 and Wood 1961: 65-67) and appears to be the latest temper type in Missouri (Chapman 1948: 101).

At this point it should be noted that the Mississippian-like points, discussed earlier, appear stratigraphically earlier than (or in the absence of) shell-tempered pottery at Phillips Spring (Chomko 1976), Saba Shelter (Vehik 1974), 23SR139 (Mori 1965), Blackwell Cave (Falk 1969), the Fulton Site (Lippincott 1972), and possibly Rodgers Shelter (McMillan 1965), and occur in the absence of shell tempered pottery at six components of the Fristoe Burial Complex (Wood 1967). At all sites

(except Phillips Spring) corner-notched arrowpoints are associated with the Mississippian-like forms and continue in time through the appearance of the shell tempered ceramics. Thus, it would appear that shell tempering is associated with small triangular points while the opposite relationship is not always true.

The faunal remains represent a wide range of species not usually associated in archaeological contexts in the reservoir area. Only Saba Shelter, Blackwell Cave, and Rodgers Shelter yielded sufficient samples of bone to make comparisons worthwhile. Species previously unreported in archeological samples in the area include: bowfin, mud and red earred turtles, lizard, diamond-backed water snake, copperhead snake, timber rattlesnake, and sandhill crane. At all three above sites, snakes were reported but not identified to species.

Only Falk (1969: Table 14) identified mussels to species. Cyprogenia aberti and Ligumia subrostrata are minor components of the naiad fauna at Blackwell Cave not present at Beck Shelter, while Tritogonia verrucosa, Pleurbema cordatum, Alasmidonta calceolus, Caruncula parva, Cyclonais tuberculata, and Lampsilis ovata ventricossa are minor components at Beck Shelter not present at Blackwell Cave. At both sites, Actinonaias carinata, Elliptio dilatatus, and Fusconia flava are major components of the mussel samples; only Amblema costata, a major component at Beck Shelter, is poorly represented at Blackwell Cave, while the reverse is true for Actinonaias ellipsiformis. The more impoverished Blackwell Cave naiad fauna may be a result of reduced suitable naiad habitat in that area as opposed to the Beck Shelter locality.

Trends seen at other sites in the area indicate that, by Late Archaic times, deer is the dominant faunal

resource with mussels increasing in importance through time (Vehik 1974: 95, McMillan 1971: 187-189 and 1976). It should also be noted that bison and elk appear to gain in importance during the latter ceramic occupations of Blackwell Cave (Falk 1969: Table 12) and Saba Shelter (Vehik 1974: 95). Whether this is a result of a change in exploitive activities or reflects an environmental shift is not clear.

Summary and Recommendations

The cultural material from Beck Shelter may be defined as representative of a multiple occupation (but single component) Late Woodland complex which exhibits characteristics associated with Mississippian influence or contact. Chronological placement of the shelter, based on projectile point form and the absence of shell tempered ceramics, is between AD 500 and 1000. It is proposed that the shelter represents a short time span within the above period.

Evidence for Mississippian relationships is seen in projectile point forms and the copper artifact—but not in ceramics. A review of the stratigraphic relationships of Mississippian-like projectile points, a generally recognized indigenous Late Woodland point form (Scallorn), and shell-tempered ceramics indicates: (1) Scallorn points may be present as the only arrowpoint form in a Late Woodland component, (2) they are the dominant point form when they occur with the Mississippian-like points (except at Vista Shelter and Blackwell Cave), (3) Mississippian-like points are always associated with Scallorn points (except at Phillips Spring), (4) in sites where the two point forms co-occur, Mississippian-like points are contemporaneous with or predate the Scallorn

point, (5) Mississippian-like points predate the introduction of shell-tempered ceramics in the reservoir area, and (6) shell-tempered ceramics are associated with both point types.

If the Scallorn point represents an indigenous Late Woodland complex which eventually adopted the Mississippian point form, one would expect this to be evident in the stratigraphic record. The fact that the reverse stratigraphic relationship exists requires explanation. Sufficient data are lacking to do so.

At present it would appear that the Beck Shelter component postdates the Miller, Thurman, Drut Knolls, and Don Bell sites; is roughly contemporaneous with the early ceramic levels (pre-shell temper) of Saba Shelter, Blackwell Cave, and possibly Rodgers Shelter; and predates the latter ceramic components at the above sites and Vista Shelter. Cultural similarities between Beck Shelter and components of the Fristoe Burial Complex have been noted and there are sufficient similarities to include Beck Shelter as a component of the Highland Aspect.

The material from the site allows for some general observations: (1) on at least one occasion the site was utilized by a family unit, (2) major activities include hunting-butchering, shell fish gathering, possibly vegetal food processing, containment, fire related activity, lithic reduction, and pigment processing, (3) deer was the major faunal resource in the early stages of site use but was augmented by bison and elk in the later occupation(s), (4) the shelter appears to be a temporary campsite occupied during the warmer months, (5) activity areas may be postulated as: a refuse area outside the overhang; a fire use area on the west side of the shelter; and a "living" area in the central part of the shelter.

Recommendations

The cultural record at Beck Shelter will help clarify Late Woodland complexes and the nature of Mississippian relationships in the western Ozarks. Unlike most sites in the area, the Late Woodland materials are in undisturbed deposits, which allow for the definition of artifact relationships and activity areas. In addition, floral and faunal remains are preserved, providing data on subsistence. It is recommended that:

(1) the charcoal samples from Features 3, 6, and 9 be submitted for radiocarbon dating,

(2) sedimentary and pollen analyses be completed for the soil columns,

(3) further excavations be undertaken to:

- (a) recover a larger sample of faunal and floral material,
- (b) define activity areas,
- (c) refine the chronological relationships within the shelter deposits,
- (d) recover a larger sample of ceramics, and
- (e) test the downslope deposits.

It is further recommended that future excavations operate in smaller horizontal and vertical units than were used in the testing to provide greater spatial control.

CONCLUSIONS

The four sites tested during the summer of 1975 are in different ecological and geomorphic settings and represent different cultural periods: the Pippens Site is in the uplands above the Pomme de Terre River and has an Archaic and Early Woodland component; 23HI241, on Terrace 1b of the river, has an Archaic and Late Woodland Component; 23HI246 and Beck Shelter occur on the hillslope above a small feeder creek and have Woodland components, the latter site exhibiting evidence of possible contact with Mississippian groups. The time span represented by the sites covers the period 3500 to 1000 BP. By 4200 BP the oak-hickory bottomland forest was established (King 1974: 550) and the hillslope vegetation was becoming similar to present.

A number of activities have been postulated for the sites. Table 30 lists activities and classes of tools which are considered activity indicators—observable units of analysis which document a single type of activity (after Ahler and McMillan 1976: 164). Following Winters (1969: 30), several artifact groups are combined into generalized functional groupings. Ahler and McMillan (1976: 164) question the "explanatory superiority" of such an approach, preferring to retain functional categories (artifact groups) as the units of analysis. The intent here is to explore general trends in what appear to be major activities (indicated by the generalized functional groupings) rather than the interrelationships among functional categories of tools.

Table 31 is a preliminary attempt to quantify the relative degree of importance of various activities. Two additional sites are included: Phillips Spring,

TABLE 30

Activities and Activity Indicators

	Activities						
	Hunting-Butchering	Cutting-Scraping	Vegetal food Processing	Lithic Reduction	Pigment Processing	Drilling Perforating	Wood Working
Indicators	Arrowpoints	Bifaces	Manos	Cores	Ground or	Drills	Gouges
	Projectile points	Modified flakes & shatter	Metates	Core flakes	Rubbed hematite		Gravers
			Pitted stones	Hammerstones	Iron concretion		Flakes with polish
		Hafted scraper	Flakes with gloss	Preforms			
				Utilized Cobbles			

	Hunting	Generalized Cutting	Complex Grinding	Hammering	Pigment Processing	Perforating	Wood Working
Correlation with Ahler & McMillan 1976	Specialized cutting	Various scraper categories	Anvil pitting	Handstone pitting			

23HI216, a multicomponent open site; and Rodgers Shelter, 23BE125, a deeply stratified rockshelter, are both on Terrace 1b of the Pomme de Terre River. Counts of activity indicators and percentages are presented (percentages minimize the inequality of sample size between sites).

Dunnel's (n.d.: 21) definition of a tool as the "maximal set of co-occurent functional attributes associated within the boundaries of a single object" is the unit of quantification. As such, a projectile point exhibiting an impact fracture and use chip scars is counted as two tools since the two functional attributes are not co-occurent (the same use does not produce both types of wear). However, a projectile point exhibiting distal edge wear (rounding) and an impact fracture is counted as a single tool since both types of wear can be produced by the same use (see Ahler 1971). Thus, the number of tools in an assemblage can exceed the number of artifacts.

In counting the number of activity indicators per activity the assumptions of Ahler and McMillan (1964: 166-167) were followed: artifacts exhibiting interpretable wear were classified to function, and morphologically similar artifacts not exhibiting wear were classified to the same function. When evidence of two functions were present on a single morphological type, indeterminate specimens were classified with the most frequently occurring wear pattern within the type.

Table 31 lists only activities represented by comparable artifacts found at all sites; perishable remains (bone and shell), ceramics, and unique objects are not tabulated and flake counts are omitted from the table. The data from Rodgers Shelter are not strictly comparable to that from the other sites. Major classes of tools (eg. modified flakes and cores) have yet to be described,

TABLE 31

Relative Emphasis on Activities at Six Sites
on the Pomme de Terre River

Setting	Phillips Spring 23HI216			Pippens Site 23BE214	23HI241		23HI246	Beck Shelter 23HI247	Rodgers Shelter		
	Late Archaic I	Late Archaic II	Late Woodland	Woodland-Archaic	Woodland	Late Archaic	Woodland	Late Woodland	Woodland	Woodland-Archaic	Late Archaic
Terrace 1b	X	X	X		X	X			X	X	X
Hillslope							X	X			
Upland				X							
Open campsite	X	X	X	X	X	X					
Rockshelter							X	X	X	X	X

Activities	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Hunting-butchering	29	17.1	4	9.3	15	19.2	15	13.2	16	15.5	4	16.7	-	-	83	44.4	234	60.3	230	46.3	117	35.5
Cutting-scraping	94	55.3	33	76.7	49	62.8	64	56.1	63	61.2	10	41.7	2	20.0	68	36.4	98	25.3	147	29.6	86	26.1
Vegetal food processing	7	4.1	2	4.7	2	2.6	4	3.5	3	2.9	5	20.8	-	-	4	2.1	6	1.5	30	6.0	32	9.7
Lithic reduction	33	19.4	4	9.3	7	9.0	27	23.7	18	17.5	5	20.8	7	70.0	27	14.4	18	4.6	32	6.4	25	7.9
Pigment processing	6	3.5	-	-	5	6.4	1	.9	1	1.0	-	-	-	-	3	1.6	18	4.6	30	6.0	57	17.3
Drilling-perforating	-	-	-	-	-	-	3	2.6	1	1.0	-	-	-	-	2	1.1	10	2.6	16	3.2	7	2.1
Wood working	1	.6	-	-	-	-	-	-	1	1.0	-	-	1	10.0	-	-	4	1.0	12	2.4	5	1.5
Totals	170		43		78		114		103		24		10		187		388		497		330	

and some functional classifications had to be inferred as similar to those used in this report (a correlation of Ahler and McMillan's activities is presented in Table 30). The relative emphasis on different activites (Table 31) is similar to McMillan's (1976: 225-226) summary of activities in the Archaic and Woodland components at Rodgers Shelter.

A major problem in comparing counts of activity indicators is that each tool is considered equivalent; Table 31 implies a projectile point is somehow equal to a utilized flake. Brose (1975) has shown that the life expectancy of a flake cutting tool is shorter than the duration of the activity (butchering) of which it is a part, whereas a projectile point may be used several times (over several activities) prior to discard. David (1972) and Deboer (1974) discuss the problem for ceramic types while Ammerman and Feldman (1974) discuss various classes of tools. At present, there is no valid method for weighting one tool type over another.

A further problem is the degree to which the tools actually reflect the importance of various activities at each site. The limited tests at Pippens, 23HI241 and 23HI246 were directed toward determining cultural affiliation and stratigraphy, not toward recovery of a statistically representative sample of site contents. Obviously, the data reflect only those activities which took place in the areas excavated; the limited tests give only a limited idea of the activities taking place at the sites. Although no statistically valid sample was recovered from the other sites, the larger areas excavated should more properly reflect the various activities and their actual relationships.

Given the nature of the above limitations, Table 31 is only a preliminary attempt to quantify the relationships

of various activities at the sites; no detailed discussion of the table is offered. The data, however, serve to illustrate an intuitively obvious generalization: (1) the relative emphasis on different activities varies through time at a single site, and (2) there is a change in emphasis of activities through space within a cultural period.

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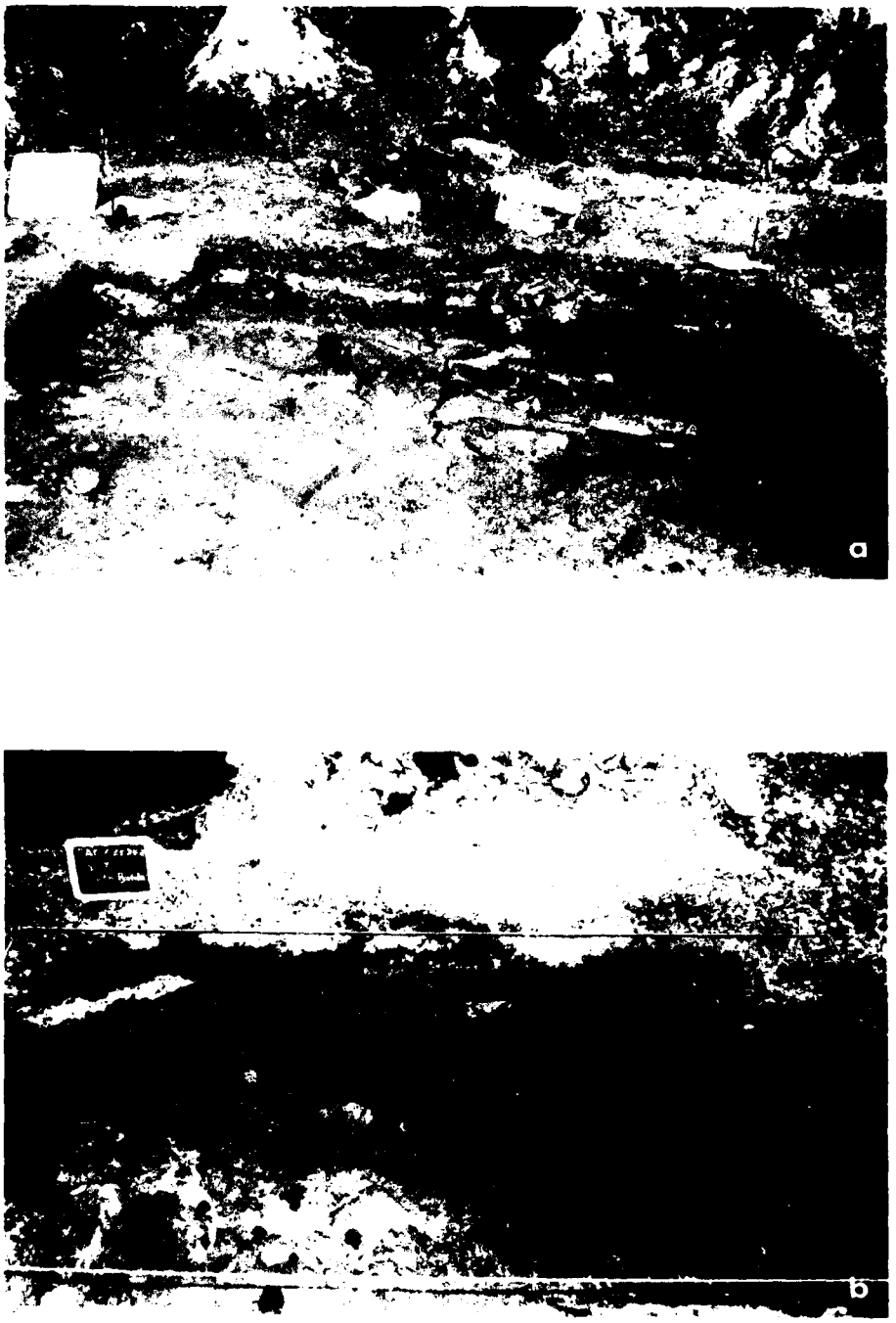

Figure 10. a, 23HI247, profile of the north wall, Square 1. Feature 3 is the light ash layer. b, 23HI247, profile of the south wall, Square 4. Feature 8 is the dark lens to the right. Feature 9 is the mottled lens near bedrock to the left.

Figure 11. a, 23HI246, view to the southeast; summer ground cover. b, 23HI247, view to the northeast, winter ground cover.

Figure 12. 23BE214: projectile points. a, d, Group 7. e, Group 9. c, f, Group 12. b, Group 14. Drill. g, Group 21. Biface. i, Group 37. Hammerstone. h, Group 64.

Figure 13. 23HI241: projectile points. d, Group 1B. a-c, Group 2. e-f, Group 10. i, Group 13. Drill, g, Group 22. Bifaces. h, Group 30. j-k, Group 33.

Figure 14. 23HI241: biface. h, Group 28. b, d, Group 35. Groundstone. a, Group 63. g, Group 67. 23HI246: hafted graver. f, Group 26. Bifaces. c, Group 27. e, Group 29.

Figure 15. 23HI247: projectile points. m-o, g-r, Group 1B. p, Group 1B. a-i, Group 2. s-x, Group 3A. j-k, Group 3B. l, Group 4.

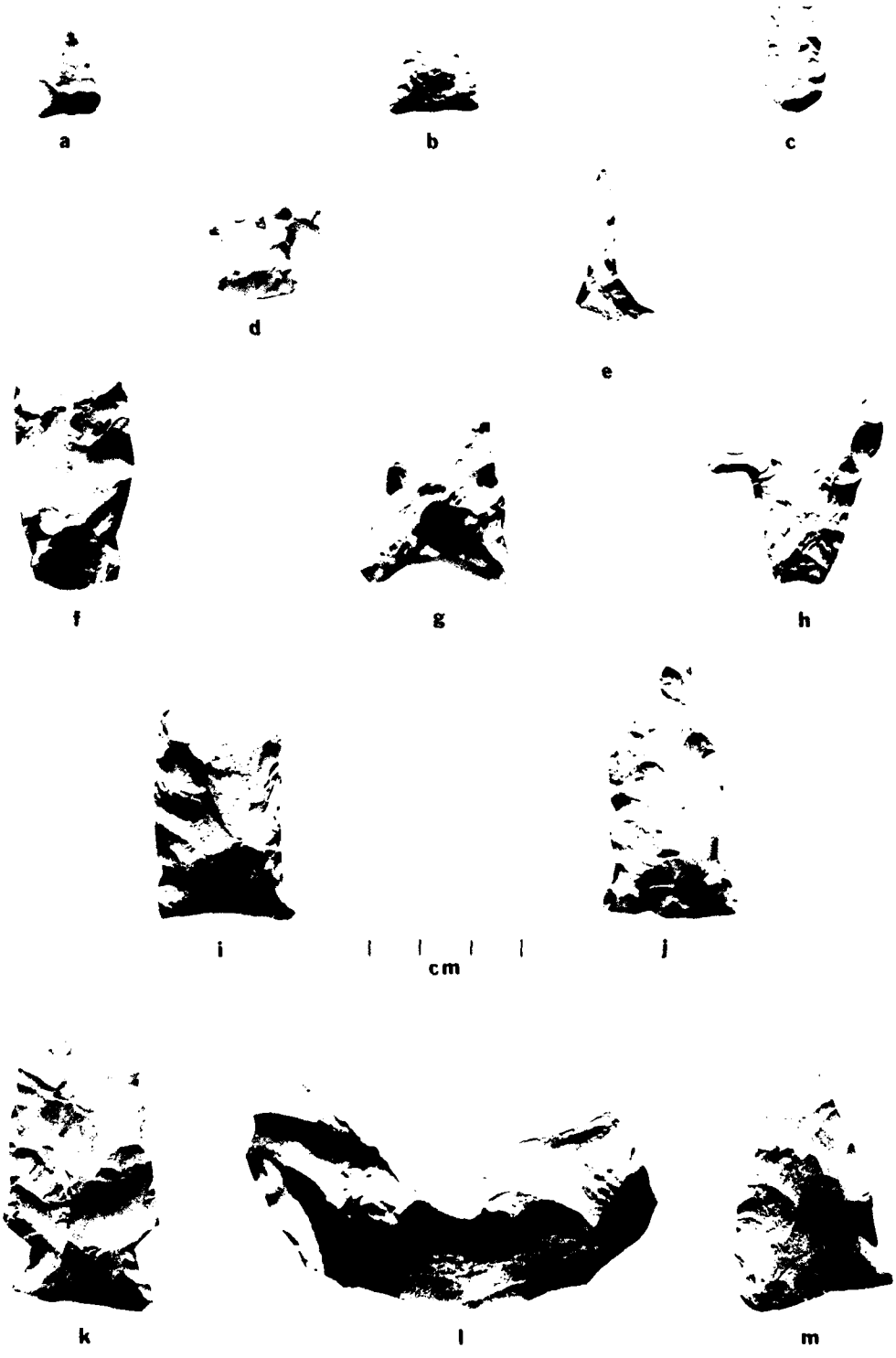

Figure 16. 23HI247: projectile points. h, Group 5. f, i-j, m, Group 6. k, Group 9. d, Group 11. g, Group 15. Drills. e, Group 23. c, Group 24. Bifaces. a-b, Group 27. 1, Group 32.

Figure 17. 23HI247: biface. e, Group 31. Worked Flakes. b, f-h, n, Group 56. a, Bone Tool. Ceramics. m, Ceramics 2. j, Ceramics 3. i, Ceramics 5. l, Ceramics 6. k, Ceramics 7. c, Ceramics 9. d, Ceramics 10.

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